JUN 17 1948

JUNE 1948

PIT AND QUARRY

the Toiler," 16-cu. yd. swing dragline at International Minerals & Chemical Corporation's new mine

This issue

World's Largest Phosphate Mine • American Road Builders' Road Show Preview • Jubilee Meeting of Canadian Institute of Mining and Metallurgy • Effective Use of Compressed Air

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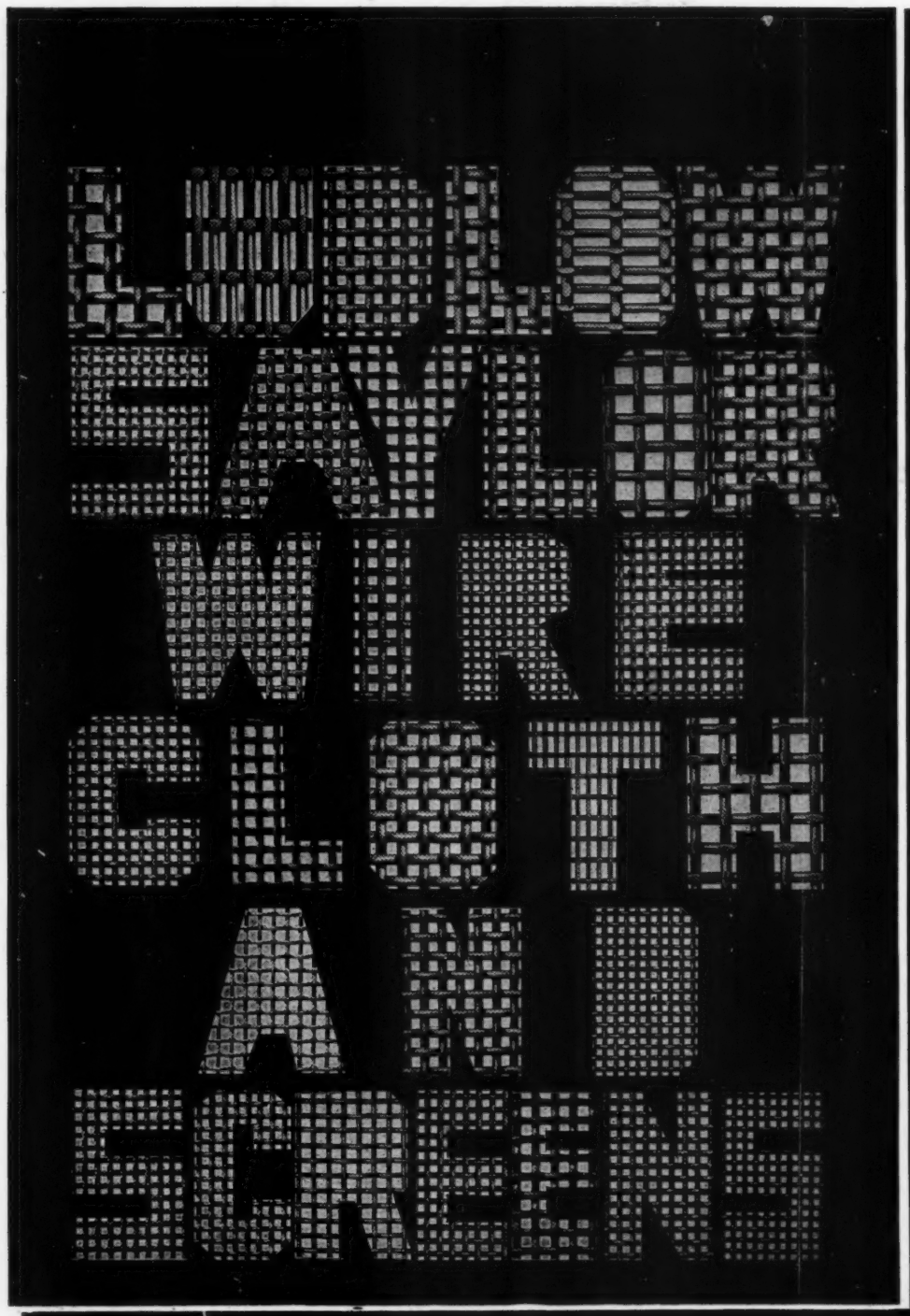

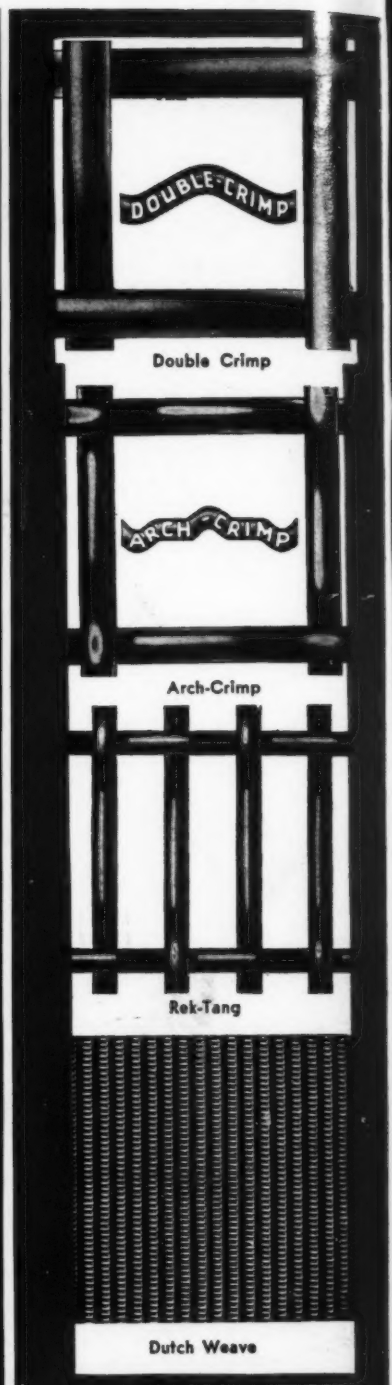

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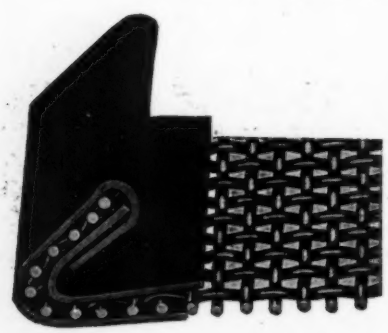

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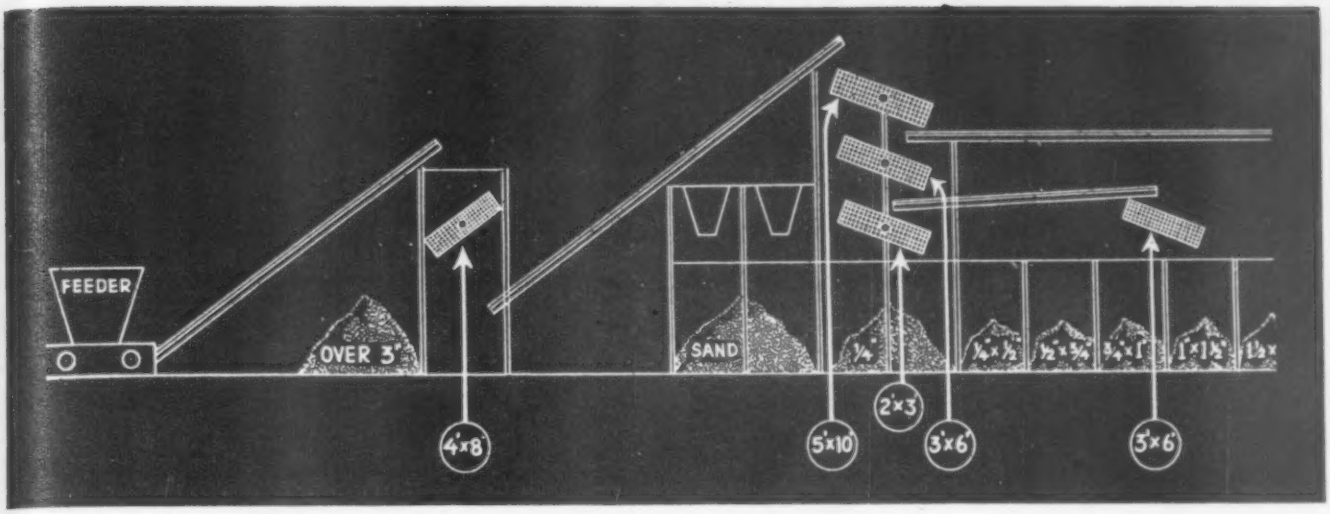

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PIT AND QUARRY

JUNE 1948

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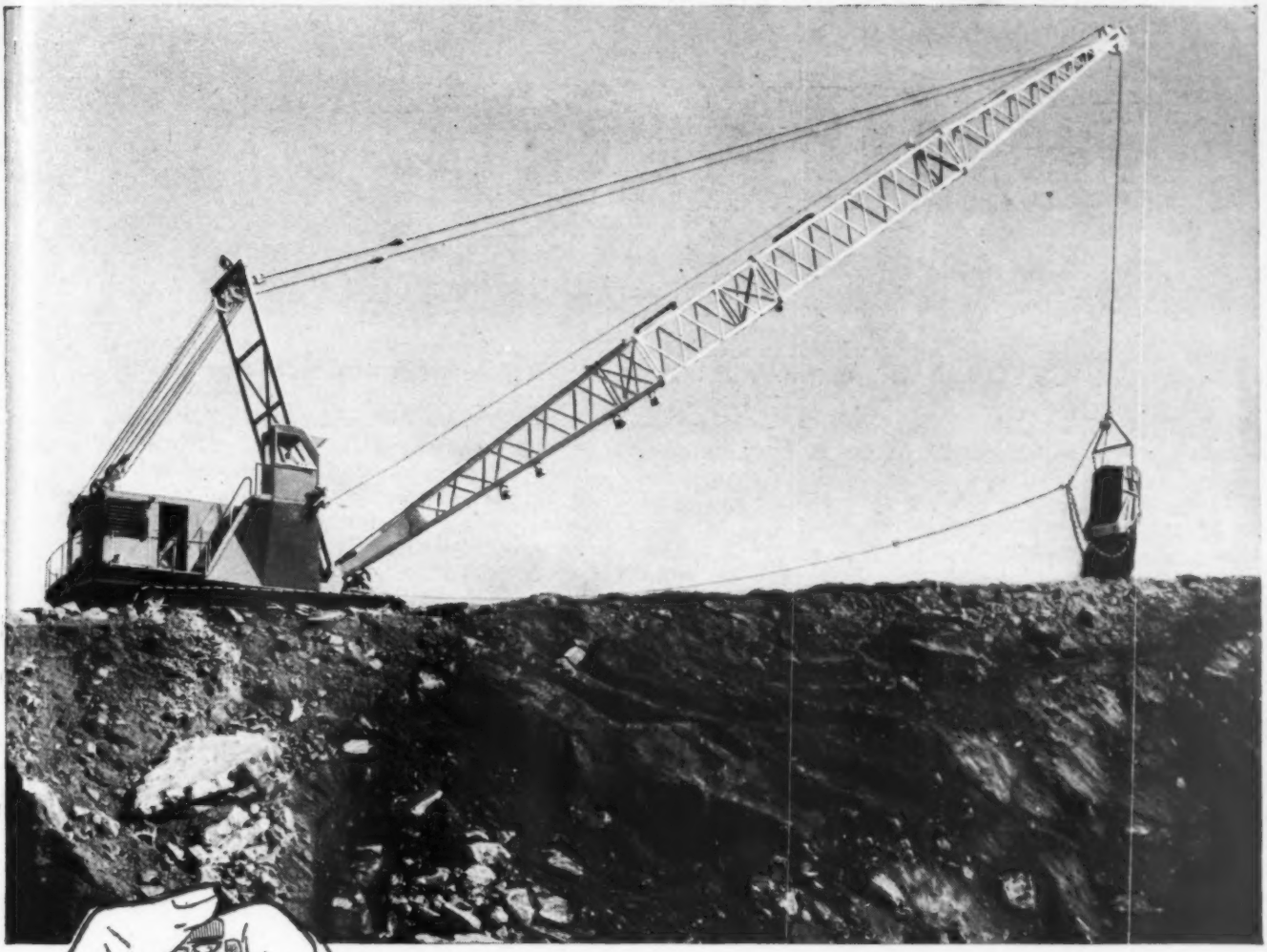
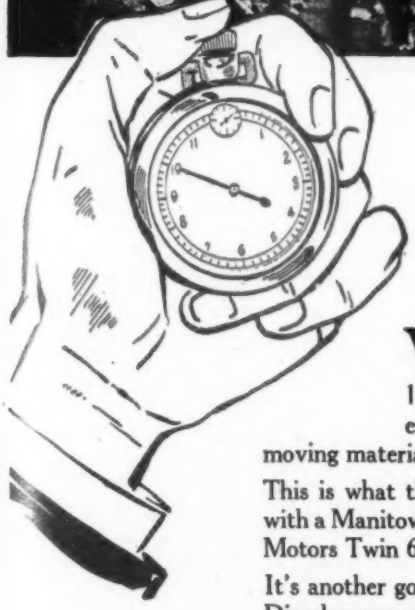


Manitowoc crane and dragline owned by the Coal Rain Coal Co., Junedale, Penna., and powered with a General Motors Series 71 "Twin" Diesel engine.



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editorial

The Cement Decision

THE recent action of the Supreme Court in upholding the Federal Trade Commission's contention that the cement industry's multiple-basing-point delivered-price system was an unfair trade practice may have far-reaching effects, not only in the cement industry, but also in iron and steel, coal, clay products and other commodities which are cheap to produce but relatively expensive to ship. If, as might logically be expected, the same action is taken on the FTC suits pending against these and other industries, it is thought that there may be set in motion a slow redrawing of the entire U.S. industrial map. By forcing producers to add freight rates to a set mill price there may result a gradual decentralization or redistribution in those industries in which the location of raw materials, markets, etc., make this possible.

The Supreme Court ruling on April 26 apparently ended a battle initiated in July, 1937, between the FTC and the Cement Institute, 21 of its officials, and 74 member firms which produce about 95 percent of the cement manufactured in this country. This decision overruled a decision of the Seventh Circuit Court of Appeals in 1946 that the government had not proved its case. In a 6-to-1 decision, the Court ruled that the cement industry's long-established basing point system is a collusive price-fixing device which violates both the Federal Trade Commission Act and the Clayton Anti-Trust Act. The Court said that the lower court (the Circuit Court of Appeals) was wrong, and that the FTC order must be obeyed, and that the lower court must take further action to see that the ruling is carried out.

According to one well-informed source this decision may make the following changes in the cement industry:

1. Assuming equal quality, the buyer's decision on where to purchase cement at lowest cost is far more important now than heretofore.
2. In general, a cement producer's market will be reduced to the geographic scope in which his plant can sell competitively.
3. The order will tend to create a geographical monopoly for a cement mill in its own marketing territory.
4. In most areas the customer's choice of a source of supply will be limited to one brand or a few brands at most.
5. Due to the current heavy demand for cement, freight equalizations will probably be relatively infrequent.
6. FTC proponents claim the pricing change will lower average cost for cement.

(The cement industry completely disagrees with this contention, claiming the reverse will be true. In this source's opinion, it appears more reasonable to expect some higher and lower cement costs for different customers with the average overall cost remaining virtually the same.)

7. Localized and sporadic shortages of cement may develop during the next nine months caused by changes in distribution necessitated by the decision.
8. In time the revised competitive conditions may influence a redistribution of cement plants.

THERE is a strong feeling in some quarters, including the FTC, that the cement industry has long evinced a strong aversion to free and open competition, that it holds such competition to be impracticable for this industry, and that no producer should attempt to excel others in quality, price or terms of sale. Some, or even most of this, may be true but we believe the reasons have been misconstrued. In the first place, anyone checking the records will find that average cement prices over a period of many years have been at a reasonable level, with none of the wide fluctuations found in most other building materials and other basic commodities. During the post-war shortage and inflation period cement price increases have been relatively much lower than for most other products. Investigation of the facts proves that the present excessive cost of construction is due to many other factors, not to the slight increase in the cost of cement which spiralling costs of wages, materials, equipment, etc., has made necessary.

No industry, especially a basic one affecting the welfare of the nation, can be expected to operate for any length of time at a loss. One has only to go back to the last depression to realize what price-cutting does to such an industry. During that period cement prices dropped to a level far below the cost of production and most cement companies did not get out of the red until eight or ten years after the depth of the depression was reached. As a result cement companies could not afford to make the necessary expenditures to bring their plants up to the levels of efficiency that normal progress demands; many of them could not even afford to bring them back to their pre-depression levels. Only a few were able to build completely new plants—less than a half dozen since 1933—whereas before the depression as many as a dozen new plants were built in one year. Is it any wonder that the cement industry is anxious to prevent any future possibility of price cutting?

AS to cement quality, investigation again will show that the average quality of the cement produced in this country compares favorably with any produced elsewhere. What most critics do not seem to realize is that cement is a basic commodity and that different makes are used interchangeably with the same mix specifications on similar construction projects or even on the same projects. Any wide variation in the quality and characteristics of the various cements available in any territory, or even throughout the nation, would greatly increase the difficulty of making good and uniform concrete. Even under present conditions the lack of uniformity and control in the designing, production and placing of concrete is the chief deterrent to the wider use of the most versatile, durable and economical of all building materials.

Walter E. Trauffer

news of the industry

PIT AND QUARRY

John J. Forbes Appointed Chief of Mines Bureau's Health and Safety Division

John J. Forbes, who joined the Bureau of Mines as a first aid miner 33 years ago last February, was appointed chief of the Bureau's Health and Safety Division on May 1. He succeeds Daniel Harrington, retired.

Mr. Forbes has been assistant chief of the division since July, 1945. He has been in immediate charge of the coal mine inspection branch since its inception in 1941, except while on special detail during World War II.

After joining the Bureau in 1915, Mr. Forbes earned successive promotions until in July, 1927, he was appointed supervising engineer of the Safety Division (now Branch) and was stationed at Pittsburgh, Pa., then its main field office. He continued in this capacity until September, 1941, when he was appointed chief mine inspector to supervise activities under the newly-approved Federal Coal Mine Inspection and Investigation Act. During the selection and training of the first group of inspectors, he retained headquarters in Pittsburgh. He came to Washington shortly thereafter.

Mr. Forbes is the author or co-author of many of the Mines Bureau's publications on mine health and safety, and he has contributed many articles in this field to technical magazines and trade publications. He is assistant secretary of the Mine Inspectors Institute of America, program chairman of the Coal Mining Section, National Safety Council, past president of the Coal Mining Institute of America and the National Mine Rescue Association, and a member of several professional societies.

John J. Forbes

Coming Events

June 21-25, 1948—Detroit. Annual meeting, American Society for Testing Materials.

July 8, 1948—Hot Springs. Directors' meeting, National Crushed Stone Association, The Homestead.

July 16, 1948—Chicago. Directors' Meeting, National Agricultural Limestone Assn., Inc., Hotel Bismarck.

July 16-24, 1948—Chicago. Annual convention and road show, American Road Builders' Association, Soldier Field.

July 21-23, 1948—Seattle. Summer convention, American Society of Civil Engineers, Olympic Hotel.

September 20, 1948—Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor.

September 22, 1948—Colorado Springs. Directors' meeting, National Sand and Gravel Association, The Broadmoor.

October 18-22, 1948—Chicago. Thirty-sixth National Safety Congress and Exposition, Stevens Hotel.

October 20-22, 1948—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association, The Greenbrier.

Joseph A. Holmes Awards For Outstanding Service in Safety Announced by Boyd

Meritorious acts of individuals who risked their lives to save others in the mineral and allied industries of the United States were considered worthy of special recognition with Medals of Honor and Certificates of Honor by the Joseph A. Holmes Safety Association, as announced by James Boyd, director of the Bureau of Mines and president of the association, after the annual meeting of the association at Washington, D. C.

Daniel Harrington, chief of the Health and Safety Division of the Bureau of Mines, who was for 22 years secretary of the Joseph A. Holmes Safety Association, was given a special award in recognition of his long service in promoting safety and his outstanding success in this field. Mr. Harrington, who retired from the Bureau of Mines on April 30, 1948, also was voted an honorary life membership on the association's board.

Howard F. Terrell, a foreman with the International Salt Company, Incorporated, Scranton, Pa., was awarded the Medal of Honor and diploma for displaying exceptional courage and risking his life to aid a fellow-employee. He jumped, fully clothed, into the water between a moving barge and a dock to rescue Wilson Brown, who was unconscious and in danger of being killed.

The following cement plants and quarries also won recognition:

Fogelsville plant, Lehigh Portland Cement Company, Fogelsville, Pa.; Sandt's Eddy plant, Lehigh Portland Cement Company, Sandt's Eddy, Pa.; Union Bridge plant, Lehigh Portland Cement Company, Union Bridge, Md.; Lone Star Cement Corporation quarry, Dallas, Tex.; Cape Girardeau plant, Marquette Cement Manufacturing Company, Cape Girardeau, Mo.; York Gray plant, Medusa Portland Cement Company, York, Pa.; Sugar Creek limestone mine, Missouri Portland Cement Company, Independence, Mo.; Permanente quarry, Permanente Cement Company, Permanente, Calif.; Southwestern Portland Cement Company, Osborn, O.; Capon Road plant, Standard Lime and Stone Company, Capon Road, Va.; Dolonah quarry, Tennessee Coal, Iron, and Railroad Company, Bessemer, Ala.

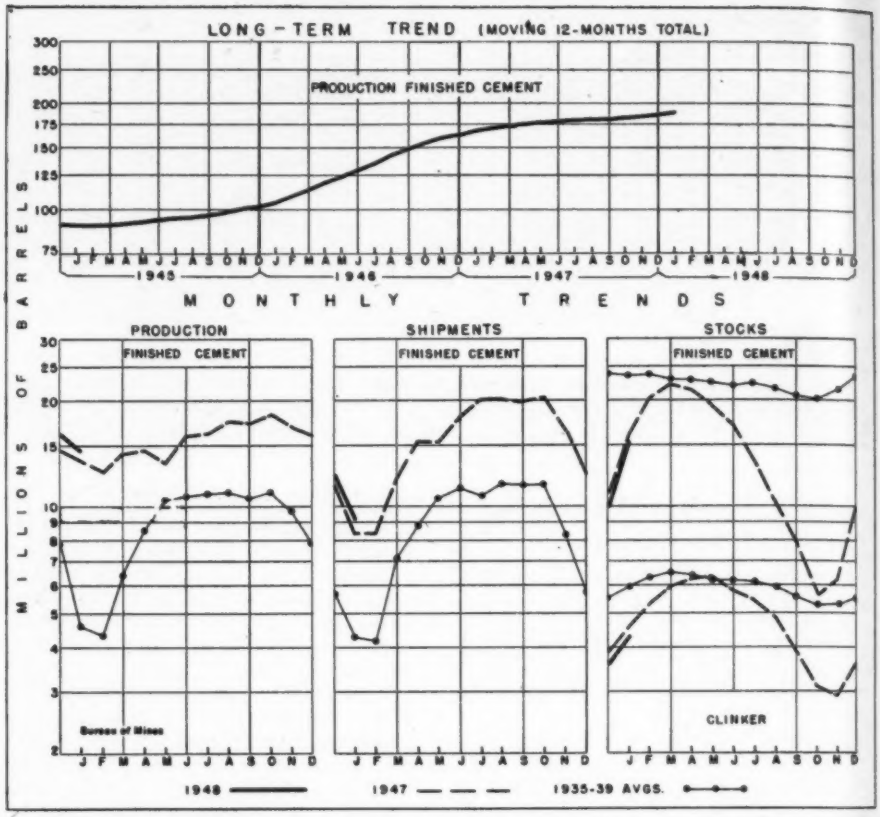
A.S.T.M. Cement Group's Spring Meeting at Denver Covers Variety of Subjects

The spring meeting of Committee C-1 on Cement, of the American Society for Testing Materials was held on February 27-28 at the Hotel Shirley-Savoy in Denver, Colo., following the annual meeting of the American Concrete Institute. An attendance of 80 members and visitors was recorded.

Matters of interest reported by the several working subcommittees included the following: progress in formulating a direct method for determining aluminum oxide in cement; a summary of various methods of tests for reactivity of aggregates in mortar and concrete; a pilot study of the 1:5 mortar bar test in three laboratories, to be followed by larger cooperative series of tests by 12 laboratories in respect to sulphate resistance; completion of a flow table design on which comments will be solicited; and progress on a cooperative investigation of the relative value of the tensile compressive and flexural strength tests of the matter in predicting the flexural and compressive strengths of concrete.

The Working Committee on Additions presented a new definition of the term "addition" which was accepted, referring also to the revised definition of the term "admixture" adopted by Committee C-9 on Concrete and Concrete Aggregates. Additional progress was reported on the SO_3 content project in which very close agreement has been reached in the data for determining the optimum SO_3 content for each type of cement. The second part of this program will be concerned with the effect of the SO_3 content of concrete durability with these optimums.

A revision of the Specification for Portland Cement (C 150) was approved which will equalize the strength requirements at 7 and 28 days for both Type II and Type V cements. Also approved was the recommendation that a third type be added to the Specification for Air-Entraining Cement (C 175) which will apply to high-early-strength cement. A study leading to the revision of the Specification for Natural Cement (C 10) is being made in which chemical requirements are being considered as a control for the degree of burning.



Production of 14,541,000 barrels of cement in January, 1948, as reported to the U. S. Bureau of Mines, was 8 percent above that reported for January, 1947. Seventy-one percent of capacity was utilized, an increase of 5 percent over that reported for the same month of 1947. Mill shipments reached 9,205,000 barrels in January, 1948, an increase of 10 percent over that reported for January, 1947. Stocks of 15,311,000 barrels on January 31, 1948, were 4 percent below those reported for January, 1947. Clinker output in January, 1948, reached 5,455,000 barrels, an increase of 8 percent over that reported for January, 1947.

Demand for cement in January, 1948, as indicated by mill shipments, although 26 percent below the December, 1947, figure, is considerably above the 1935-39 average. Only the eastern Pennsylvania-Maryland, and the west Missouri-Nebraska-Oklahoma-Arkansas districts report decreases from the January totals of 1947. The remainder show increases ranging from 1 percent in the western Pennsylvania-West Virginia district to 50 percent in the Colorado-Wyoming-Montana-Utah-Idaho district.

The long-term trend in production of finished portland cement, as indicated in the accompanying chart, continues its upward swing. Monthly production, shipments and stock trends, compared with the 1935-39 average, are also indicated graphically.

Kansas Freight Increase Held Down to 5 Percent

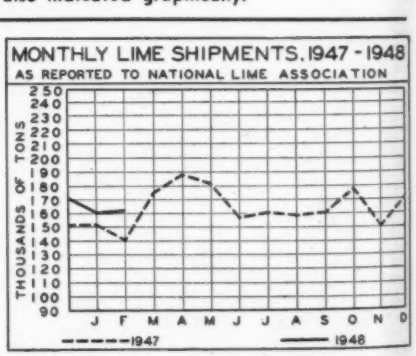
An increase of 5 percent in Kansas intrastate rail shipping rates for sand, gravel, chat, fluxing stone, broken stone or crushed rock, and road building aggregates was granted on March 31 by the Kansas Corporation Commission. A greater increase in rates, the commission said, "would only divert large amounts of traffic and result in an actual reduction of revenues to these carriers."

The commission refused an increase for agricultural limestone used as a soil building agent. It stated that rates for this product should be kept at a level which would encourage use of soil-improving agents, in order to increase the state's agricultural production.

Although increases were allowed for some other commodities, the commission denied a general 20 percent intrastate freight rate boost which had been asked by nine railroads operating in the state.

An increase of 10 percent in Florida intrastate rail freight rates on shipments of road aggregates, such as gravel, stone and related commodities, was granted by the Florida Railroad and Public Utilities Commission, effective April 1. On all but a few other specific commodities, the commission allowed a 20 percent increase in rates.

In approving a general 20 percent increase in intrastate railroad freight rates, effective April 23, the Georgia State Public Service Commission barred any increase on clay, shale, scrap iron carloads, and limited to 10 percent the increase on pulpwood, sand, gravel, crushed stone and similar commodities.



According to data collected by the National Lime Association, 45 companies in February, 1948, shipped 162,565 tons of lime (103,972 quicklime; 58,593 hydrate). Reporting companies represent 49.6 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 360,500 tons. Shipments by uses and grades for February, 1948, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	195	8,182
Building	9,818	27,167
Chemical	93,959	23,244
Totals	103,972	58,593

Harrington Retires from U. S. Mines Bureau Post After 34 Years of Service

Marking the close of a distinguished career in government service, Daniel Harrington, chief of the Health and Safety Division of the Bureau of Mines and an international authority on mine safety, retired from official duties on April 30 at the age of 70, after more than three decades with the bureau.

As a fitting climax to a lifetime of public service, Mr. Harrington received on May 28 an award for outstanding accomplishments in mine safety from his *alma mater,* the Colorado School of Mines. He has also received an honorary membership in the American Society of Safety Engineers, the Washington Safety Society and other organizations interested in the forwarding of safety.

Joining the Bureau of Mines in 1914 as a mining engineer, Mr. Harrington advanced to chief engineer of the Safety Division in 1926. Nine years later he became chief of the Health and Safety Division.

Among many noteworthy achievements over the years, Mr. Harrington directed the administration of the Federal Explosives Act during World War II. Hundreds of million pounds of non-military explosives were manufactured and used in the United States, but not one clear-cut case of sabotage involving explosives was reported.

As the organizer of the staff to carry out provisions of the Federal Coal Mine Inspection Act of 1941, and as administrator since that time, Mr. Harrington also achieved an impressive record of public service. More than 18,000 inspections of coal mines have been made and scores of thousands of federal recommendations carried out to promote safety in the mines. Significantly, fatality rates in coal mines have shown a downward trend in the years 1942-48.

Born in Denver, Colo., on April 26, 1878, Mr. Harrington was educated at the Colorado School of Mines, receiving a degree in mining engineering in 1900. Shortly after graduation, he was engaged as mine surveyor by the Utah Fuel Company at Sunnyside, Utah, and became chief engineer for that company in 1906. He next was employed as construction engineer for the United States Smelting, Refining and Mining Company at Eureka, Utah, and, in 1908, became a consulting engineer with headquarters at Salt Lake City. For five years (1909-1914) he served as mine superintendent of a coal mine operated by the Big Horn Collieries Company at Crosby, Wyo. Subsequently, in November, 1914, he joined the staff of the Bureau of Mines in the capacity of mining engineer.

Mr. Harrington is the author of nearly 300 publications dealing with virtually all aspects of mine safety. He is also associated with many professional and scientific organizations, including the American Institute of Mining and Metallurgical Engineers, Mine Inspectors Institute of America, National Safety Council, Coal Mining Institute of America, and the Interdepartmental Safety Council. For more than 20 years, he has been secretary of the Joseph A. Holmes Safety Association and also secretary and news letter editor of the mining section of the National Safety Council.

Daniel Harrington

Institute Organized to Spur Better Specification Practices

The Construction Specifications Institute, Incorporated, a new organization dedicated to the improvement of specification writing and practices in the construction and allied industries has been launched in Washington, D. C. It is composed primarily of specification writers, architects and engineers, both in private and public practice.

The object of the institute will be to compile and analyze statistics and information; to engage in the research and study of new methods and all problems dealing with specification writing; and to establish and maintain a clearing-house of unbiased technical information on specifications for the fabrication and installation of construction materials and equipment.

James E. Moore, chief of the Specification Review Unit, Division of Hospital Facilities, U. S. Public Health Service, was elected president. Other officers include the following: Carl J. Ebert, head of Architectural Section, Bureau of Yards and Docks, Navy Department, vice-president; and Francis A. Updegraff, architectural engineer, Construction Division, Veterans Administration, secretary-treasurer.

The North Carolina Highway Commission last year laid out a record total of $42,015,693.54 for approximately 10,000 miles of additions, improvements and repairs, according to Chairman A. H. Graham. The commission has an even larger program scheduled for 1948, Mr. Graham stated.

Gypsum Industry Bows to High Court Decree but Rejects Allocation Plan

Two recent developments have highlighted the government's participation in the affairs of the gypsum industry. The Supreme Court refused to reverse an earlier decision that the United States Gypsum Company and five other gypsum corporations had violated the anti-trust laws in their use of patent licenses for price fixing. It denied a petition filed by these firms for a rehearing of their case.

Two weeks later the gypsum board and lath industry declined to enter into a voluntary agreement to allocate their output to users specified by the government as "essential." Spokesmen for eight major companies notified the Commerce Department of their decision, saying that such an agreement was unnecessary because the output of gypsum products will be sufficient to meet the latest estimated housing requirements for 1948.

Industry leaders forecast their 1948 output at more than 5 billion square feet, barring unforeseen difficulties. The U. S. Commerce Department estimated the 1947 production at 3,878,000,000 square feet. Expansion and improved methods are expected to account for an increase this year.

N.I.S.A. Names K. E. Tobin Assistant to Secy. Ahearn

Kenneth E. Tobin recently joined the staff of the National Industrial Sand Association at the Washington, D. C., office as assistant to Vincent P. Ahearn, executive secretary.

Mr. Tobin received his education at Georgetown University. During World War II he served in the Army in France, Belgium, Holland and Germany. He received the Combat Infantry Badge, the Purple Heart with Oak Leaf Cluster, the Bronze Star and the Silver Star.

Kenneth E. Tobin

$1,000,000 Building Institute Proposed for Denver To Meet Building Demand

A cooperative effort of Denver city officials, businessmen and builders to meet the heavy demand facing the building industry has crystallized into what is to be known as the Denver Plan. At the heart of the Plan will be the Denver Building Institute, enthusiastically described as follows: "A million-dollar, modernistic building products and service center with 60,000 square feet of floor space which will be constructed...in the very heart of the city on a main intersection...Into this building will go the best the building industry has to offer—a complete cross section of the entire building field."

A total of 36,000 square feet of floor space will be devoted to permanent exhibits of building materials and supplies, as well as a home-planning division, sales conference rooms and consultant services.

The Institute will also offer a special section of exhibits and consultants to the farm building program, geared for close articulation with governmental and other farm agencies. The goal: more and better farm construction.

Marquette Cement Mfg. Co. Names J. C. Holm to New Post

Officials of the Marquette Cement Manufacturing Company have announced the appointment of Jens C. Holm, widely known industrial engineer and cement production specialist, to the newly created post of director of engineering. A. F. Miller, who for 20 years has been Marquette's engineering consultant and who had temporarily occupied the position of chief engineer, will continue to serve the company in a consulting capacity, it was announced.

Jens C. Holm

Mr. Holm had for the last 12 years been employed by F. L. Smidth & Company of Copenhagen, Denmark, and its affiliates in setting up and revitalizing cement plants in all parts of the world. He had engineered the construction of a number of cement plants for Smidth in India, Ireland (Eire) and New Zealand before coming to this country.

The new headquarters of the American Potash and Chemical Corporation are located at 3030 W. Sixth Street, Los Angeles. The building is a two-story concrete structure containing 24,000 square feet of floor space.

U.S. Gypsum Company Buys Gypsum Properties of Pacific Portland Cement

The Pacific Portland Cement Company has reported the sale of its plaster mill and gypsum properties at Empire, near Gerlach, Nev., to the U. S. Gypsum Company. The company has reserved all brands and trade marks used in the gypsum and plaster business, and also the other gypsum properties, reserves and resources in California, Nevada and elsewhere. The amount paid for the properties was reported to have been $2,125,550.

J. A. McCarthy, Pacific Portland president, who made the announcement, stated that the manufacture of gypsum wall board and other gypsum products will be continued at the Redwood City, Calif., mill. The plant has been operated by the Pacific Portland Cement Company for the last 25 years.

Madison Limestone Company's Modernization to Boost Output

The addition of much new equipment at the Madison Limestone Company's plant near Huntsville, Ala., is expected to boost production to about 30 tons per hour, according to F. M. Jarrell, owner and manager. This will be an increase over former capacity of 50 percent.

New equipment includes a conveyor, a pulverizer and a motor. The firm has seven trucks for hauling and spreading.

Columbia Gypsum Products Plans Operation at Spokane

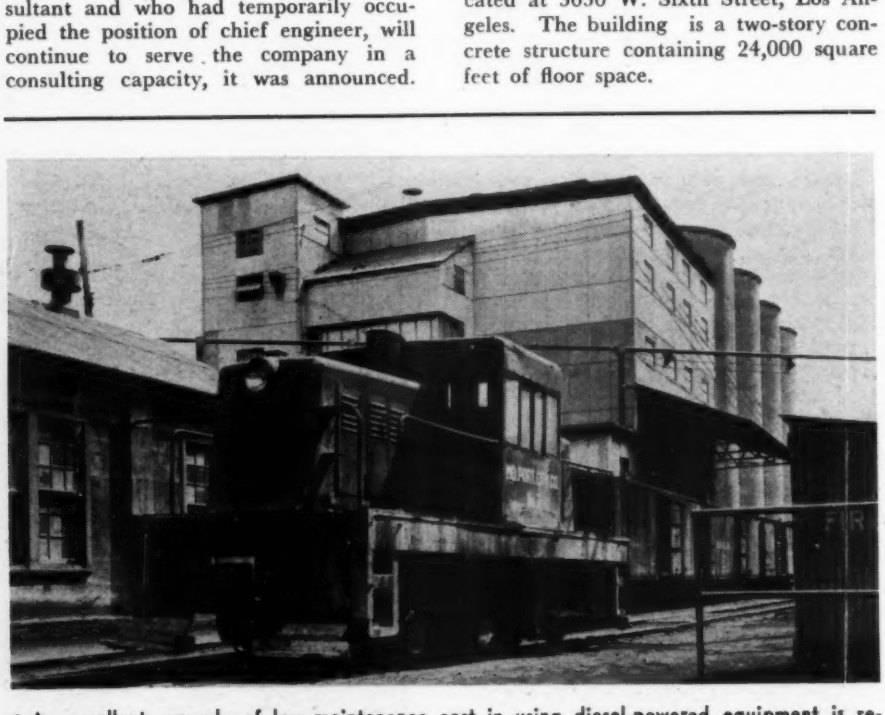
Plans for the processing of gypsum at a plant in Spokane have been announced by officials of Columbia Gypsum Products, Inc., of Bremerton, Wash. Raw material supplies would be shipped to Spokane from the company's extensive holdings in British Columbia, which are said to contain 40,000,000 tons of high-grade gypsum.

Officers of the concern include the following: Loren G. Brown, president; John Tenold, vice-president; Walter Park, secretary, and Ken Spotts, treasurer.

Lininger Company Goes Back Right Where It Started From

Operations at the Lininger Sand and Gravel Company's new quarry north of Ashland, Ore., have been begun after three weeks of intensive work. A concrete-and-steel building was constructed to house new crushing equipment, which will be powered with diesel motors and plant-generated electricity.

Products of the plant will be sand and gravel and several sizes of crushed stone. The company also operates plants at Medford and Central Point, Ore. It was organized at Ashland about 20 years ago, but moved its equipment to Medford in 1940. Partners in the company include B. M. Lininger, Earl Lininger, Raymond Lininger and Bert Wright.



• An excellent example of low maintenance cost in using diesel-powered equipment is reported by the Missouri Portland Cement Company of St. Louis, Mo. A switch engine used by the company recently completed 25,000 hours of extra-heavy service without an overhaul.

The switcher, a 50-ton Porter locomotive powered with two Model HBI-600 Cummins diesel engines, went into service in July, 1941, and has been used continuously since that time. During this period, one broken valve was repaired and the fuel pumps were changed. These minor repairs were the only ones necessary during this extended period. Fuel consumption for the engines averaged only 3.11 gallons per hour.

Government Survey Report Reveals Mineral Supplies Are Far from Exhausted

Contrary to recent scarehead reports, there is little likelihood of "imminent exhaustion" of the nation's vital mineral supplies, according to *Mineral Resources of the United States,* a detailed survey prepared by the U. S. Bureau of Mines and the Geological Survey. Published in book form by the Public Affairs Press of Washington, D. C., the survey constitutes the most authoritative source of information on the mineral resources position of the United States.

In calling attention to the importance of the survey, the *New York Times* recently carried a special feature article about its findings. This article highlighted the significance of the survey in these terms:

"It offers the latest, and by far the most comprehensive and the most objective analysis ever made of the much debated question of our mineral reserves ...it will be eagerly consulted...it will serve as a bible of the minerals industry for some years...of exceptional importance to a correct evaluation of the military potential of the United States."

Among the leading conclusions of the report are the following:

The United States "is exceptionally well supplied with coal, reasonably well off in iron ore...and potentially self-sufficient in petroleum."

"If technologic and economic changes permit use of known sub-marginal resources," the United States can become virtually self-sufficient in 21 minerals (including coal, iron ore, petroleum, copper, and aluminum ores), but completely dependent upon foreign sources for 5 minerals (platinum, tin, industrial diamonds, quartz crystal, and asbestos), and partly dependent on foreign sources for 13 more.

Included in the book are separate chapters on the following 39 different minerals and commodities:

Antimony, arsenic, asbestos, bauxite, bismuth, cadmium, chromite, coal, cobalt, copper, industrial diamonds, fluorspar, gold, graphite, helium, iron ore, lead, magnesium raw materials, manganese, mercury, strategic mica, molybdenum, natural gas, nickel, nitrates, petroleum, phosphate rock, platinum metals, potash, quartz crystal, salt, silver, sulphur, tantalum, tin, titanium, tungsten, vanadium, and zinc.

Among the most valuable features of the book are its scores of tables, charts, and maps regarding trends of production, distribution of deposits, probable reserves, etc.

Copies of the book can be obtained from Public Affairs Press, 2153 Florida Avenue, N. W., Washington 8, D. C. The price is $5.

General Portland Cement Co. Reports $2,637,000 Profit

Tabulated in the first annual report of Smith W. Story, president of the General Portland Cement Company, are the combined operating results of the company and its three predecessor companies (Florida Portland Cement, Signal Mountain Cement and Trinity Portland Cement) in 1947, as compared with the combined operating results of these firms in the preceding year:

Net sales in 1947 amounted to $14,724,600; in 1946 they totaled $12,042,400. The 1947 net profit was $2,637,000, as compared with $1,956,900 in 1946.

Figures on the first quarter of this year indicated that the net income for the three months ending March 31 totaled $814,900, after provision for federal income taxes, as compared with $409,900 for the same period of 1947. Net sales amounted to $4,001,500; last year, for the first three months, the net sales reported amounted to $2,852,400.

Medusa President Honored For 50 Years of Service

The April issue of the *Medusa Mirror,* official organ of the Medusa Portland Cement Company, was dedicated to President J. B. John, in honor of his fiftieth year in the cement industry.

Mr. John is now in his thirty-sixth year with Medusa-Newaygo brands. He began his career in the cement industry on April 1, 1898, at the Ormrod (Pa.) plant of the Lehigh Portland Cement Company.

At the annual mill banquet a large bronze plaque suitably inscribed and bearing Mr. John's likeness in relief, was presented to him as a gift from all Medusa employees.

The diesel boat *Virginia* of the Cumberland River Sand Company, Nashville, Tenn., is out at work with 16-cylinder General Motors engine rated at 1,230 hp. at 730 r.p.m.

Color-Sound Film on Soil Ready for Booking by Agstone Division Members

Henry A. Huschke, managing director of the National Crushed Stone Association's Agricultural Limestone Division, has announced that the organization has on order six copies of a film of interest to farmers, civic clubs, 4-H clubs and other similar groups. It is *The Other Side of the Fence,* a 16 mm. color film produced by the Phillips Petroleum Company.

Quoting from Mr. Huschke's announcement: "It graphically depicts the fact that our soils are seriously depleted in minerals and that such deficiency is the cause of many nutritional ailments of both human beings and animals. The story is personally told by Dr. William A. Albrecht of the University of Missouri, in an interesting and dramatic manner. Running time of the film is about 20 minutes."

Members of the division will receive further details as to the rental fee. Meanwhile, all those interested in obtaining the film are requested to notify Mr. Huschke.

A.S.C.E. Spring Meeting At Pittsburgh Draws 800

Pittsburgh's Hotel William Penn was the headquarters for the spring meeting of the American Society of Civil Engineers, which was held from April 7 to 9. About 800 members attended the sessions of the 95-year-old society. The Pittsburgh section was host to the 68 other local sections.

Committee and board meetings, as well as various conferences, preceded the general sessions. Construction, highways, city planning, air transport and other civil engineering subjects were featured in the technical sessions.

• J. T. Callaway (left) and Charles Upham, president and engineering-director, respectively, of the American Road Builders' Assn. For details about the A. R. B. A. Road Show and 45th convention, see page 71 in this issue.

Natl. Gypsum Co. Reports Sales-Profit Increase—Makes Stock Offer

The National Gypsum Co. reported first quarter earnings of $1,521,933, as compared with $1,314,617 a year ago, and announced that directors have approved sale of 422,467 shares of common stock to stockholders.

Also announced was an increase in the number of directors from eight to ten and election to the board of Charles E. Master, vice-president in charge of finances, and Gordon H. Tarbell, who retired in March as vice-president in charge of operations.

Indicated sales for the quarter were $15,388,014, an increase of 34.2 percent over the $11,619,895 sales in the initial three months last year.

"While earnings were up over last year," said President Melvin H. Baker, "they did not reflect the increase in sales because of high costs at the four new plants. The completion of the tune-up period and the beginning of capacity operations at the new operations will bring lower costs and will later have a favorable effect on income."

Officials stated that the $5,000,000 expected from the stock offering will be employed to finance a larger volume of business. National Gypsum has practically completed its major expansion plans for the present. With four new plants (completed last year) moving into full production, the company's 1948 output is expected to be 20 percent greater than that of last year.

800,000 Cubic Yard Blast Set Off at TVA Quarry Face

An interesting shot recently set off at Wautoga Dam, near Elizabethton, Tenn., by Tennessee Valley Authority engineers has received considerable notice. The blast, made to obtain material for the rock fill of the dam, was the second of three planned in the Wautoga Dam quarry. It produced about 800,000 cubic yards of loose rock. Believed to be the largest blast ever made on construction work, it required 527,000 pounds of nitramon. A third and last shot is planned for some time this year.

The total amount of rock required for the fill is estimated at 1,863,000 cubic yards, of which 714,000 cubic yards has been placed. In addition to the rock, engineers estimated that 1,494,000 cubic yards of earth fill will be needed, of which 550,000 cubic yards has been delivered.

General Portland Cement Co. Launched on Expansion Plan

More than $4,000,000 is being spent by the General Portland Cement Company for improving and expanding its facilities. During 1947, its first year, the company spent $2,385,000; and this year officials plan to lay out $1,900,000 more.

General Portland, formed in 1947 from three companies—Trinity Portland, Signal Mountain Portland and Florida Portland—operates in the southeastern portion of the United States (from Kentucky to Florida) and as far west as New Mexico. The company's 1947 expansion program increased its production by 1,250,000 barrels. Plants located at Tampa, Fla., and Houston, Tex., are expected to figure conspicuously in plans to take advantage of the current export demand for cement.

Lone Star Cement Corporation Issues 29th Annual Report

The twenty-ninth annual report of the Lone Star Cement Corporation for the year ending December 31, 1947, recently issued, contains an impressive presentation of the company's operations in the two Americas and Cuba.

Fifteen mills, located in various parts of the United States and in Cuba, Argentina, Uruguay and Brazil, have a total annual capacity of 27,000,000 barrels. The report indicated a consolidated net profit for the year 1947 of $6,337,424, as compared with $5,293,214 for 1946.

• The Wautoga Dam quarry face beginning to roll after the big blast.

Marquette Explains Stand On Continuing Sales Policy In Basing Point Case

According to an official statement released by the Marquette Cement Manufacturing Company, "nothing in the recent Supreme Court decision in the 'cement case' requires it to change its sales policies."

"If Marquette finds that its quoted price at any destination where it seeks to do business is higher than the price quoted by a competitor," the release continues, "it will be the company's policy to meet that lower price whenever it seems good business to do so."

The statement was issued by Marquette to inform customers as to the effect, if any, that the high court decision would have on company selling policies. That decision upheld a Federal Trade Commission order forbidding Marquette and 73 other cement producers from maintaining combinations to fix prices. The FTC held that this was done through the use of the multiple basing point system.

In defending its position Marquette officials stated that the Supreme Court decision "merely requires the enforcement of a Cease and Desist Order of the Federal Trade Commission" directed against certain business practices when done pursuant to combination or agreement. According to their interpretation, the court "emphasizes that the order will not 'bar an individual cement producer from selling cement at delivered prices such that its net return from one customer will be less than from another even if the particular sale be made in good faith to meet the lower price of a competitor.'"

Bill to Permit Rate Agreements Passed Despite Protests

On May 11 the House of Representatives passed the Bulwinkle bill permitting railroads and other means of transportation to make agreements on rates with immunity under the anti-trust laws on condition that these agreements are approved by the Interstate Commerce Commission.

The bill was passed by a 262-53 vote, despite protests of opponents who charge that the railroads had spent "at least a million dollars trying to get (it) passed". The Department of Justice anti-trust division also protested against the legislation, but it was approved by the ICC, the National Association of Railroads and Utilities Commisioners and many shippers.

A similar bill was passed by the Senate, and it is expected that discrepancies in the two measures will be reconciled.

At the meeting of the southern California Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers, Dr. Louis C. McCabe, formerly U. S. Bureau of Mines, now director of Air Pollution Control, Los Angeles County, gave an address on *Some Aspects of Air Pollution.*

30 years ago in Pit and Quarry

by Walter E. Trauffer

THE June, 1918, issue of PIT & QUARRY contained a complete illustrated description of one of the first sand and gravel plants to use a stockpiling system with tunnel belt conveyor recovery. This was the 700-cu. yd. per day plant of the Ware Sand & Gravel Co., Cincinnati, Ohio. This operation was also notable for the fact that its hydraulic dredgeboat on the Ohio River had a dual pumping system, with two 10-in. Morris pumps. Screening was done on board the boat by revolving screens, and barges towed by a steam tug delivered the sized aggregates to the shore plant or to other points. At the plant a stiff-leg derrick unloaded to a car on an incline. The feature of the 25,000-ton stockpile, it was said, was that it made deliveries possible almost the year around.

In this issue was also announced the publication of the 1918 *Directory of Cement, Gypsum and Lime Manufacturers,* the 12th edition, corrected to January 1, 1918. It contained a list of cement companies; a list and location of mills with map; an alphabetical list of officers; names of superintendents and chemists of cement companies; a list of brands of cement; a list of gypsum companies; a list of lime companies; a buyers' guide; names of officers of the Portland Cement Association and of the National Lime Mfrs. Assn.; statistics on the output of Portland cement, lime and gypsum; and advertisements of machinery and supplies manufacturers. This complete pocket-size, 264-page book has developed through the years into the *Pit and Quarry Handbook and Directory* of today.

The Agricultural Lime and Limestone Assn. meeting in Columbus, Ohio, on May 1 was described. The chief subject of discussion at this meeting was the fineness to which agricultural limestone should be ground. Eastern members favored minus 100-inch material, while those from the Middle West favored minus 10-mesh or even minus ¼-in. material. It was decided to concentrate research on this subject. The growing trend toward the delivery of agstone in producer-owned trucks was also discussed.

Among those attending this meeting who are still active in this industry were the following: Fred Witmer, Ohio Hydrate & Supply Co., Woodville, Ohio; Prof. Firman E. Bear, Ohio State University, Columbus; William H. Hoagland, Marble Cliff Quarries Co., Columbus, Ohio.

Other major articles in the June, 1918, issue gave valuable information on bookkeeping methods, insurance, safety, costs, etc. The growing popularity of cold-mix asphalt was also described.

In the Men and Machinery Section such equipment as dust collectors, heavy-duty motor trucks, blasting caps, sand pumps, etc., was described.

E. W. Magnus Heads Staff Of W. H. Loomis Talc Corp.

E. W. Magnus of Waterbury, Vt., was elected president of the W. H. Loomis Talc Corp., at the annual meeting of the board of directors to succeed A. Prescott Loomis. Mr. Magnus is also vice-president and general manager of the Eastern Magnesia Talc Company, Burlington, Vt.

E. W. Magnus

Mr. Loomis was elected to the position of treasurer. A. Frank Atkinson was re-elected as vice-president and general manager. Donald Hager was elected to the new position of vice-president and technical advisor. Also re-elected were Joseph Baumert, secretary, and Mrs. Kenneth D. Storie, assistant secretary-treasurer.

Mechanized Behemoths Flatten 160 Acres in Record Time

At Peoria, Ill., a few weeks ago a novel metering device was used to indicate progress in a large-scale public improvement project. The "Earthometer" shown in the accompanying illustration metered the work of a million dollars' worth of giant, rugged, earthmoving machinery —140 pieces of equipment—as 160 acres of land were leveled and graded for a park and recreation site.

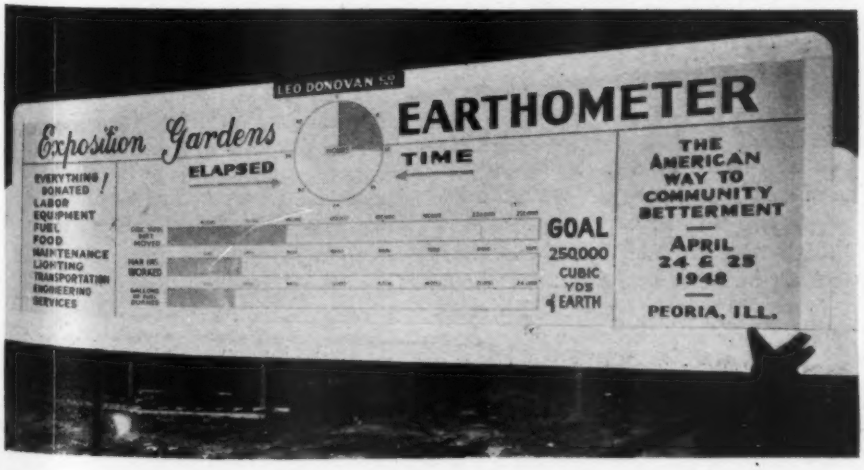
In the most spectacular achievement of its kind ever attempted, the "Off-the-Roadeo," staged at Exhibition Gardens, six miles from downtown Peoria, moved more than a quarter million cubic yards of dirt in less than 48 hours.

The entire operation was performed by voluntary effort—work that would have cost more than $90,000. Every item used in the job was contributed free of charge —the operation of the machines, the machines, the gas and oil they used, food the workers ate, and the lights that made night work possible.

Army engineers were there to observe performance of the latest creations by manufacturers of heavy equipment. Thousands of visitors drove by the site for a glimpse of the demonstration. Reporters and photographers from newspapers, wire services, and magazines were present for the demonstration. Also on hand to record and transmit the unprecedented event were television, radio, and newsreel men.

Among the many firms represented was the McGrath Sand and Gravel Company of Lincoln, Ill.

Tires manufactured by The Goodyear Tire & Rubber Company played an important part in carrying graders and scrapers over the rough, uneven terrain. More than 70 per cent of all machinery used on the project was equipped with Goodyears.



• Progress of the 48-hour leveling and grading project was shown on this Earthometer.

The sternwheel towboat *Robert T.* is being overhauled at New Martinsville, W. Va. Installation of a 110-hp. General Motors diesel engine is one part of the modernization. The *Robert T.* is the third craft of the Ohio River Sand & Gravel Corporation's fleet to be remodeled. The *Dorothy* and the *Bob S.* are the firm's other boats.

WASHINGTON NEWS LETTER

LABOR difficulties have again become the top domestic problem plaguing government officials — just as they were the top domestic problem last year. But this year the setting is different.

A year ago government economists were observing a decline in consumer purchasing power and a slowing down of the economic machinery, particularly in retail trade. They thought they saw the beginnings of a recession. They feared that a wave of strikes which would further cut consumers' incomes, both of strikers and affected non-strikers, would start the down-hill slide to depression. Noticeable relief was evident when the steel interests maneuvered the coal industry into its now historic settlement with John L. Lewis, giving his mine workers the greatest wage increase to date and the best contract they ever had.

This year, the shoe is on the other foot. The fear is not that strikes will precipitate deflation, but rather that they will add to the already serious inflationary pressures. These pressures are sure to be bolstered by the large government expenditures which have been authorized. Furthermore, even the most avid control-minded official recognizes that price control this year is a political impossibility. The hope, then, of avoiding inflation lies almost entirely with increased production. But strikes cut production, and the particular strikes which are already in process or pending are likely to cut production where it hurts most. In addition, domestic labor difficulties are of great concern because they can have international political effects. The surest way to lose the advantages to be derived from our extensive commitments abroad is to fail to deliver on time, and strikes can result in just that failure.

At this writing, the CIO Packinghouse Workers' strike against the Big Four Meat Packers, which has been underway since March 16, is still going strong. The United Auto Workers has selected the Chrysler Corporation for their test of strength this year, and a similar drawn-out contest is expected, since the government, unless its present attitude changes, is not likely to invoke the injunction powers of the Taft-Hartley Act. On the railroads, we are operating under the unstable peace secured by court injunction, while being threatened by a telephone strike and a strike against the shipping lines, both of which will almost surely be similarly enjoined.

The really big problem has yet to be faced and that, of course, is the possibility of a coal strike in July—or September if the Taft-Hartley Act cooling off period is complied with. There are two schools of thought here on what will happen. The majority expect a big strike, developing into a national crisis. They reason that John L. Lewis always does best in that atmosphere and he is certain, therefore, to create it. The minority reasons differently. They believe that the always unpredictable "man behind the eyebrows" will again catch the public and the administration off base; that he will settle peacefully for a modest increase, either in wages or in some non-wage item such as pensions. As foundation for their prediction, they point to the following considerations: (1) John L. Lewis is anything but impractical. (2) His earlier strike this year was, in effect, a failure. After the strike, he secured no better deal than he could have had without a strike. The strike was expensive, not only in lost days of work but also because of the substantial fines which may have to be paid. (3) The temper of the people, of Congress, and of the Administration in this election year makes it almost impossible to prosecute a big strike. They'll throw the book at him—injunctions, fines, unfair labor practice charges, law suits, and probably new restrictive legislation. (4) His miners are already among the very highest-paid groups of industrial workers. (5) And, finally, he doesn't need a large wage increase to outstrip his principal competitor among labor leaders, Philip Murray, who secured not a single cent for his Steel Workers this year because he was tied down by a no-strike pledge in a two-year contract which does not expire till 1949.

Strikes or no strikes, a boom has already been underwritten for 1948 and well into 1949 by the volume of expenditures authorized and planned by the federal government. After dragging its feet for some time, Congress approved the European Recovery Program. Although all the money has not been appropriated as yet, Paul Hoffman's Economic Cooperation Administration is virtually certain to get as much of its authorized funds as it needs. In great part, this is due to the fortunate choice of Mr. Hoffman and the fact that Congress appears to be convinced that the expenditure of these funds is safely in the hands of men with business experience. But the expenditures for European recovery are only the beginning of increased government spending.

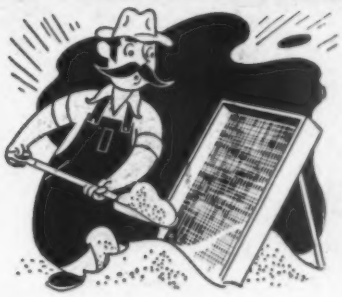
Congress, in this election year, is obviously unhappy about antagonizing constituents by approving universal military training or even selective service. In fact, it has decided that, in so far as possible, it would prefer to substitute flying machines for men. Whether this is wise decision, from a military point of view, is open to question; but there is no question that it is a more expensive procedure. It appears now that defense will cost at least three billion dollars more in 1949 than it did in 1948, with most of the increase devoted to building a larger air force. Present plans contemplate almost the same increase for every year up to 1952. Nor is that all.

Although still in the talking stage, there is an increasing trend toward the resumption of Lend-Lease. The Western European countries are working out a common defense program with what appears to be the unspoken blessing of the United States. Sooner or later these plans will bog down without the aid of American arms.

The economic atmosphere in 1948-49 can be expected to be reminiscent of the early war years. Boom and uncertainty are likely to be the keynotes. While the uncertainty will affect most of industry, the boom will not be so evenly spread. It looks like a metals-and-aircraft boom, with many other industries scrambling for the leftovers. Can such a situation be permitted to develop, or will government controls be required? That is the question which is being asked all over Washington—*sotto voce*.

A $250,000 gravel plant erected by the Inland Aggregates Company at Niles, Calif., is scheduled to begin operation on July 1. The firm, headed by W. A. Gellerson, has leased 40 acres from the California Nursery Company.

Screenings



by William M. Avery

LIKE birthdays in general, ours is probably of little interest to anyone except ourselves, but just for the record Screenings is (or should we say *are*?) a year old this month. We find the fact mildly surprising on two counts: first, that a year can zip by so quickly; and second, that the scrawny brat has managed to survive at all. Since no one has offered to donate a cake, we're going out by our lonesome and hoist one to celebrate the occasion. If the department stays afloat for 10 or 15 years, we're going to hang up some memorable celebrations.

Rx

THE concrete age recently moved forward a notch or two with the assignment of a patent to North American Cement Corp. on a type of cement which has definite germicidal properties. Used in structural concrete the material is said to make floors in hospitals, gymnasiums,

dairies and other food handling establishments virtually germ free.

If any *more* admixtures are developed for cement, it will obviously only be a matter of time until cement chemists and concrete technicians will be required to obtain degrees in pharmacy.

Maybe Tums Would Help

ONE of the nonmetallic minerals has been rescued from obscurity by an article entitled *Vermiculite, Strangest of Minerals* in the May issue of *The Readers Digest*. Apparently the *Digest's* editors have grown a little weary of beating the medical profession to the punch in finding cures for all the ills of mankind, and are now branching out into other fields. If their effort on vermiculite is a fair example of what is to come, the construction materials industries are in for a rough ride.

Usually the *Digest* plants little gems of this sort in some other publication, and then (rather ghoulishly, we've always thought) reprints a condensed version in its own pages. Their "discovery" of vermiculite, however, seems to have found no takers, so rather than leave their readers in the dark they printed what might fairly be termed an undigested digest, or perhaps "indigestible" is the word we're groping for.

We aren't yet sure just what qualities of vermiculite make it the "strangest of minerals," but we have the *Digest's* word for it that its "development seems likely to revolutionize building construction." This is certain to flabbergast a great many people who know a lot more about vermiculite than we do. The material unquestionably has many important applications in the building industry, but as an aggregate in load-bearing concrete we have the impression that it ranks between Grape Nuts and Puffed Wheat.

Safe Deposit Operation

NOT long ago we noted that the British government had presented a 3,000-lb. chunk of the Rock of Gibraltar to the Prudential Insurance Co. to be used as the cornerstone of their new western home office building in Los Angeles. It's a nice gesture, but if John Bull keeps up that sort of business, we wonder how long Prudential can safely use its "Strength of Gibraltar" slogan as a symbol of security and stability.

While we're in the wondering mood, we're tempted to speculate that perhaps the British have decided the only sure way to keep the sun from setting on their empire is to farm out a few hunks here and there for safe keeping.

Hard Bargain

BASIC Magnesium, the world's largest magnesium plant, built by the Government at a cost of $140,000,000, has been sold by the War Assets Administration to the State of Nevada for $1 down and a promise to pay $24,000,000 over a 20-year period. This deal probably sets some sort of new record for deferred-payment purchases, as well as preserving intact Uncle Sam's reputation for concerning himself only with non-profit operations.

We suppose the State of Nevada opened up by offering a down payment of 50 cents, whereupon the WAA negotiators, shrewd bargainers that they are, ruthlessly drove the price all the way up to a buck.

Vice and Immorality

A CHAP in Newark has been arrested on a vice and immorality charge because he operated a concrete mixer on Sunday. That probably explains why vice and immorality get along so well in Newark: the cops have been told that they have some connection with mixing concrete.

As long as this quaint aberration is confined to Newark we don't see any point in making an issue of it. But if it ever starts creeping over the border into the *United States*, we're going to start a defense fund.

Noralyn mine opens new era

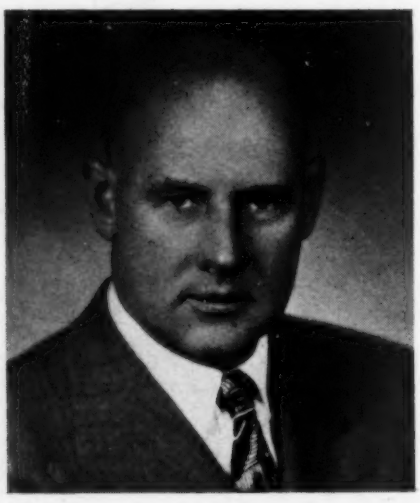
New International phosphate property developed at cost of $10,000,000 will produce 1½ million tons annually

By WILLIAM M. AVERY

another ON THE SPOT report

THE most important and dramatic news to come out of the phosphate industry in many a year concerns the opening of International Minerals & Chemical Corporation's huge new Noralyn Mine located near Bartow, Fla. In magnitude, in efficiency, in complexity, and in cost, Noralyn is unique in the phosphate industry. In a very real sense it marks a culmination of all the accumulated know-how and the vast technological progress in mineral recovery gained over the past half century plus several years of applied research and development. In no small measure, it represents a personal achievement of the part of three of International's top executives: Louis Ware, president of the corporation, a mining engineer with many years of experience, who has taken an active interest in the company's phosphate operations; Franklin Farley, vice-president of the Phosphate Division, a top-notch chemical engineer and scientist, who heads up International's phosphate activities in Florida, Tennessee and Montana; and Dr. Paul D. V. Manning, vice-president in charge of the Research Division, who supervised the process design.

Even from a purely statistical standpoint the Noralyn story is a remarkable one. The property is expected to produce about 1,500,000 tons per year of high-grade pebble phosphate. The huge investment (approximately $10,000,000) is based on proven mineral reserves which are expected to keep the plant in full production for a minimum period of 25 years, as against the 10-



• Louis Ware, a graduate mining engineer, has been president of International since 1939. Under his vigorous leadership the company's phosphate operations have been expanding steadily.

• Franklin Farley has been vice-president of International's Phosphate Division since 1941. He is a graduate chemical engineer, and has been actively associated with the phosphate industry since 1923.

• James P. Margeson Jr., executive vice-president of the corporation, was among the top company officials and guests who were present at the formal opening of Noralyn Mine on April 20.

• This general view shows the principal International buildings at Noralyn, with the two giant thickeners in the background. Tailings are stored in the dammed area in the far background.

• Right: After stripping the overburden the 16-cu. yd. walking dragline excavator digs the matrix and dumps it into an open pit, from which the material is sluiced into a 12-in. pump.

• Below, right: The flotation building, which also houses the spiral recovery section, and the bins for finished product from which the two grades of phosphate are loaded into cars.

to 12-year operating period for which most phosphate plants are designed. Among the important new features incorporated in the Noralyn plant are the world's largest thickeners—two giant units measuring 383-ft. in diameter, which supply from 20,000 to 30,000 g.p.m. of clear return water.

Noralyn is expected to turn out a 77-percent b.p.l. product (the highest market grade sold in the pebble field) with the remarkably high recovery rate of 92 percent from the plant feed. The classifiers in this installation have a combined raking capacity of 100,000 tons per 24-hr. day, and the combined capacity of the pumps is 150,000,000 gals. per 24-hr. day. There are 13 hydro-

separators in all, ranging from 25 to 383 ft. in diameter.

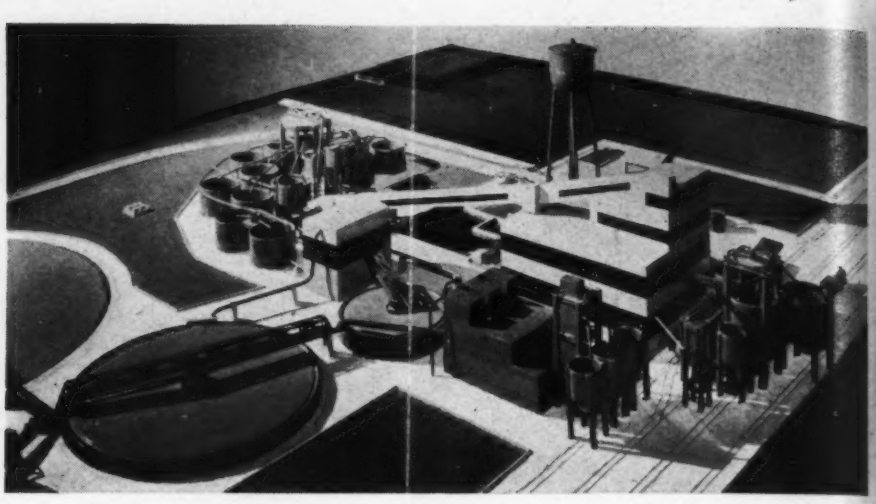
Striking as these facts are, they are merely some of the visible aspects of the phosphate industry's unprecedented effort to attain the tremendous output so urgently needed to avert mass starvation in many sections of the world. Although the Florida phosphate fields are producing at the highest rate in history, both domestic and foreign demands are increasing steadily. Even with Noralyn's huge output, International alone carries on its books a 3-year order back-log, based on capacity operations, and other producers of phosphate are similarly swamped.

Viewed in this light, Noralyn is far more than a huge and brilliantly conceived industrial development. It represents an important gambit in America's effort to heal the critical wounds which the last war inflicted upon the agricultural productivity of practically every nation in the world. As the leading shipper from the leading phosphate producing state (Florida ships more than 4 times as much phosphate as its nearest competitor, Tennessee), International has pointed the way to what can and must be done to bring fertilizer production up to the required level.

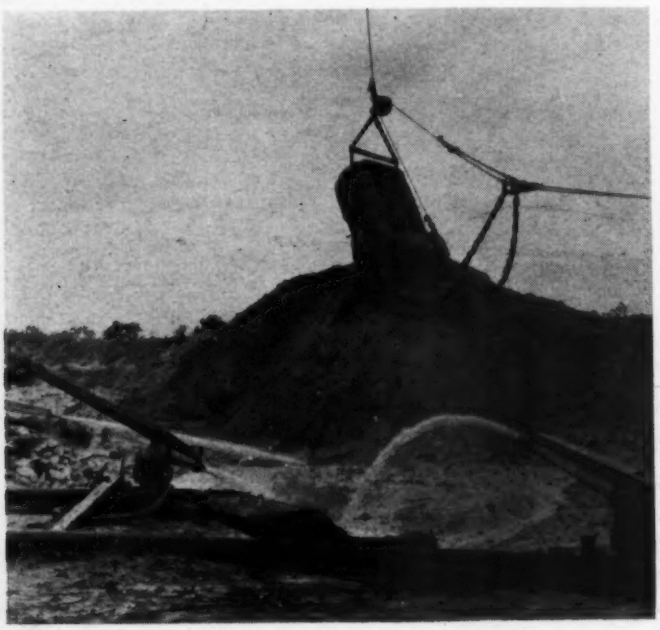
In modern practice phosphate plants are painstakingly designed to fit a specific property, and if the process design in properly carried out the resulting plant will usually not be suited to any other phosphate deposit. Thus the preliminary planning and process design for a modern phosphate mine may very well cost more than the mine itself cost 20 years ago. Before actual construction was started at the Noralyn mine, four years were devoted to intensive prospecting, research and process study. For two years prior to the breaking of ground on May 1, 1946, International's Research Division carried on elaborate laboratory studies and pilot plant operations to guide their process design. These phases were carried out in Florida by Dr. I. Milton LeBaron, supervisor of phosphate research, who was in direct charge, and his staff. Before work was begun on the full scale plant all processes which had not previously been carried out on a tonnage basis were tried out at other International recovery plants. The value of these exhaustive preliminary investigations was dramatically demonstrated by the initial performance of the completed plant, which gave every promise of completely fulfilling the expectations of the designers.

Noralyn mine is located in the approximate center of a 2,000-acre

We are proud to present the first description of the new Noralyn plant of the International Minerals & Chemical Company. While it is incomplete in some departments, at company request, this article, with the accompanying photographs, is a fairly complete presentation of this outstanding operation.—The Editor.

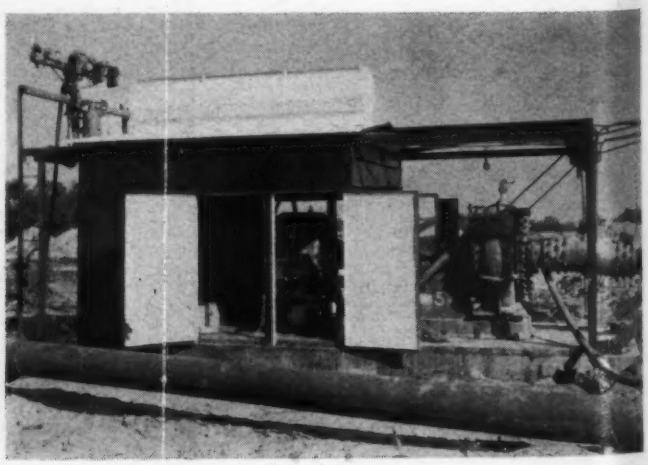


• This scale model of Noralyn was built after a firm design had been developed in exhaustive pilot plant studies.

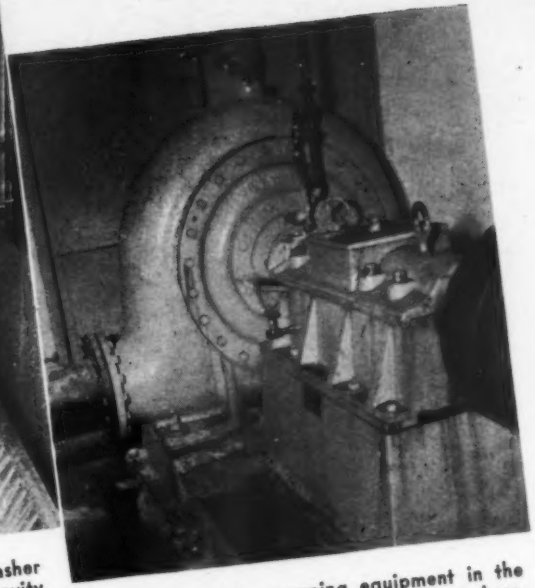


• Left: Six-in. hydraulic guns with 2½-in. nozzles sluice the matrix into the pump intake.

• Below: A view of the 12-in. sand pump which is currently in use for pumping matrix from the mine to the washer. It is direct-connected to a 300-hp. induction motor.

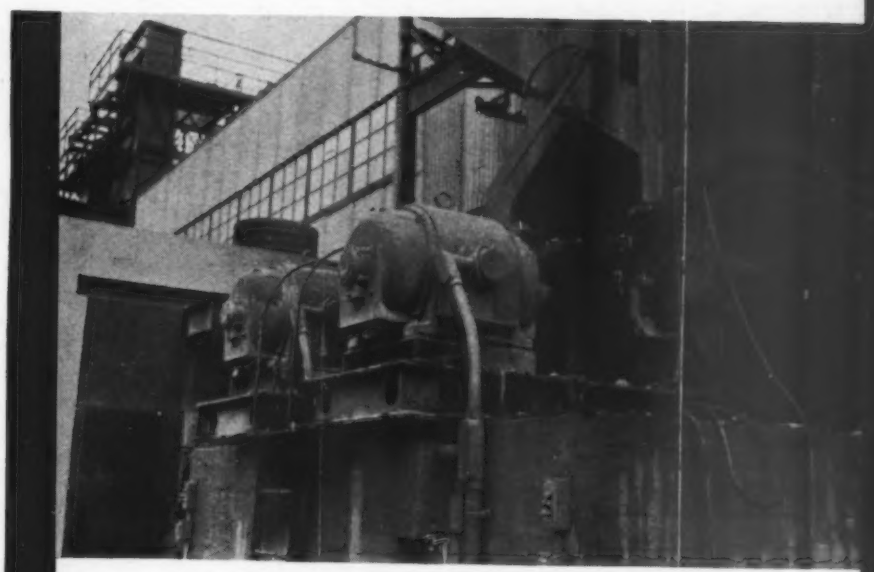


• Gravity screen and trommel in the washer section. Material passing through the gravity screen goes to the 175-ft. hydroseparator.

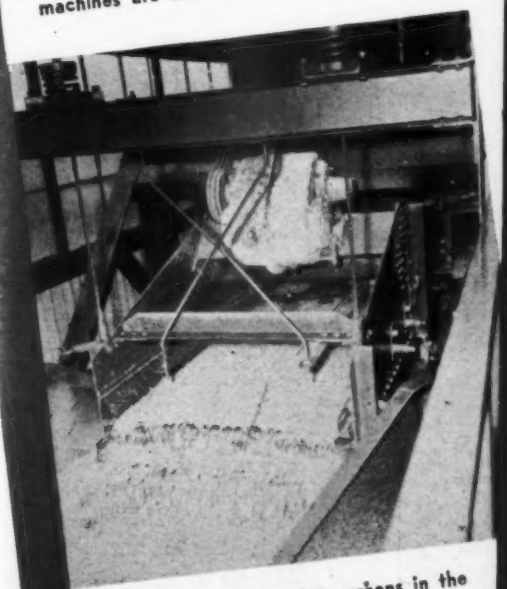


• Most of the pumping equipment in the plant is of the make and type shown here. This unit pumps the hammermill discharge back to the feed end of the washer section.

• Two log washers are in each circuit of the washer section, making six in all. These machines are among the largest ever built.



• A closeup of the hammermills at the washer section. Oversize particles are reduced here and pumped back through the plant.

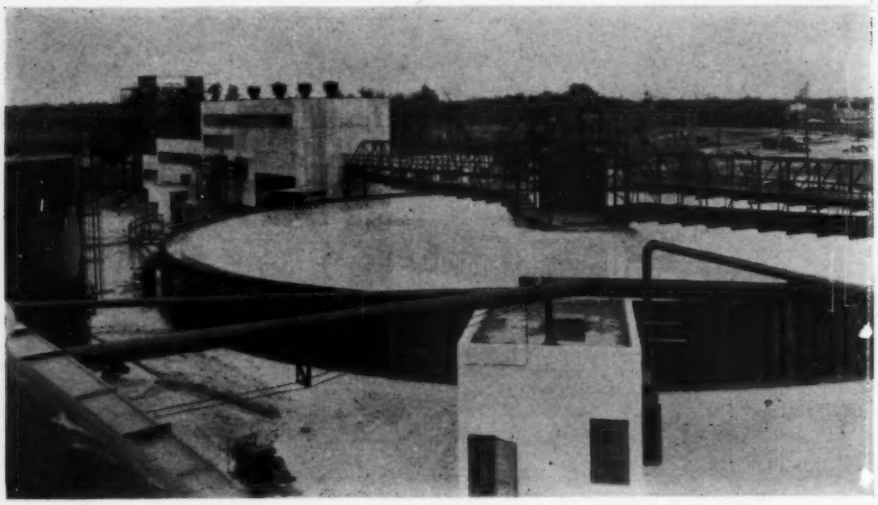


• One of the vibrating screens in the washer section.

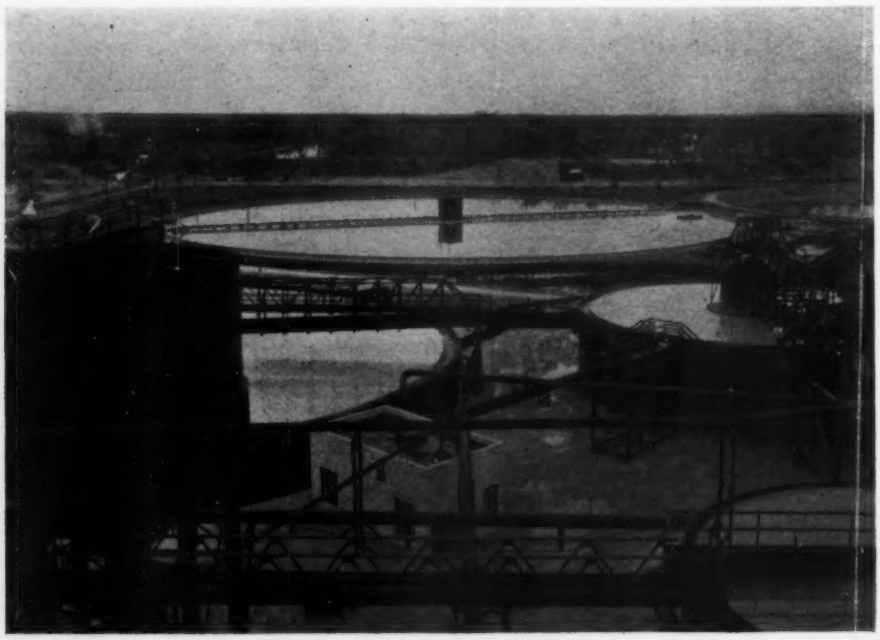
• Five screw classifiers in the desliming section remove the greater part of the minus 28-mesh material.

tract containing the highest grade pebble phosphate known in this section of Florida. The land, known as the "Old Still" property, was purchased by International in 1945 after extensive prospecting and thorough study of the cores. The tremendous scope of the operation is indicated by the fact that the plant and the settling and tailings disposal areas alone occupy close to 600 acres of ground.

• A general view of the desliming section, with the 85-ft. hydroseparator at the left. Two of the 10 storage tanks for flotation feed are in the foreground.



• A view of the 175-ft. hydroseparator. The washer building is in the background.



• One of the 383-ft. thickeners, with part of the 175-ft. hydroseparator at the left. The 85-ft. hydroseparator is at the right.

Noralyn's output of 1,500,000 tons a year of phosphate product will require the mining of 10,000,000 cu. yds. per year of overburden and matrix. The latter, ranging from 15 to 20 ft. in depth, lies beneath an average 15-ft. layer of overburden. Both stripping and recovery are done with a Bucyrus-Erie 650-B electrically-driven walking dragline excavator. Equipped with a 175-ft. boom set at an angle of 30 deg., this machine has a dumping height of approximately 75 ft., a dumping reach of about 168 ft., and digging reach and depth of 171 ft. and 105 ft., respectively. With the 16-cu. yd. bucket used by International the 650-B can handle a maximum load of 82,000 lbs. It has a self-contained walking traction mounting. The electrical equipment consists of two M.G. 650-hp. synchronous driving motors, two 250-hp. hoist motors, two 250-hp. drag motors and three 75-hp. swing motors, all equipped with Ward-Leonard variable-voltage controls. The machine operates from an alternating-current source, with the two motor-generator sets furnishing direct-current power for the seven driving motors. Somewhat smaller than International's "Bigger Digger" at Peace Valley (which has a 21-cu. yd. bucket), the 650-B still ranks as one of the largest dragline excavators in the nonmetallic field. It has been named "Tillie the Toiler" in honor of International's mine superintendent, I. S. Tillotson.

"Tillie" dumps her 16-cu. yd. bites of phosphate rock matrix into an open pit. High-pressure water jets,

(*Continued on page* 79)

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AT THE BIGGEST SHOW ON EARTH

BETTER ROADS • FOR A BETTER WORLD •

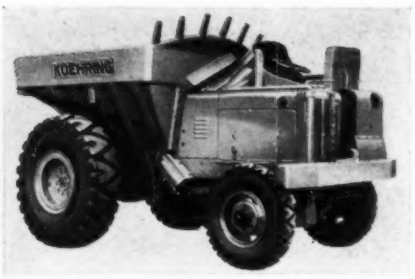
For nine days, July 16-24, Chicago will play host to "The Biggest Show on Earth"—The American Road Builders' Association's 45th Annual Convention and Road Show. More than 100,000 out-of-town visitors will inspect the equipment exposition at Soldier Field where 300 manufacturers will exhibit, demonstrate and operate over 5,000 pieces of modern construction machinery.

This gargantuan Road Show is a timely revival, after a lapse of eight years, well befitting the widespread interest in road construction—further stimulated this year by the promise of a record-breaking $1,500,000,000 expenditure.

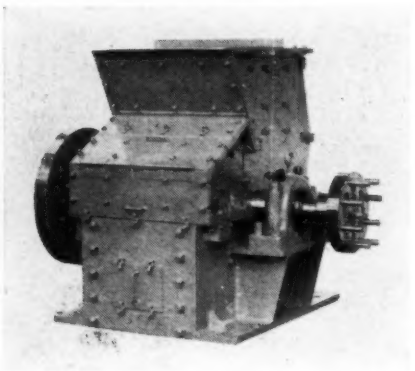
Producers of nonmetallic minerals have big and vital stakes in present and anticipated road building programs. According to estimates prepared by Pit and Quarry's research department, approximately 16 percent of all the cement produced in 1947, 42 percent of all the crushed stone, and 43 percent of the sand and gravel went into road construction.

Because these producers have important business interests in road programs, and because much construction equipment is interchangeable with that used in the nonmetallic mineral industries, we have prepared a short preview of the Road Show. Photographs and text on the following six pages describe and illustrate a few of the 5,000 pieces of equipment which are now being assembled for "The Greatest Show on Earth." See you at Soldier Field.

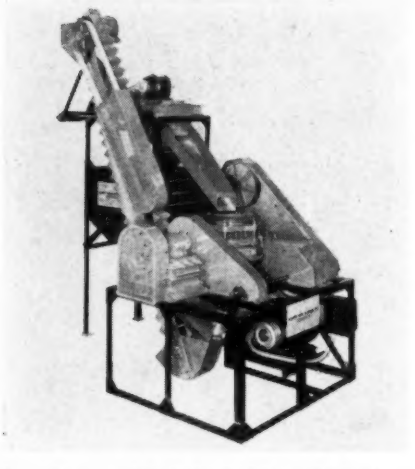
AT THE BIGGEST SHOW ON EARTH



A Koehring 6-yd. Dumptor.



The Jeffrey Type B-3 hammermill.



A working model of the Smith crushing plant.

● **KOEHRING COMPANY** will unveil four completely new machines at its road show equipment "fair" at Soldier Field.

Marking their entry into the 2½ yard excavator field, Koehring is featuring their recently-developed Model 1005, which has not previously been shown to the earthmoving industry. Road Show visitors will have opportunity to study this new 2½-yard excavator and its many new features.

Another Koehring first-showing will be a new 12-yard hauling unit, high-speed, off-road machine featuring controlled gravity dump. The smaller, 6-yard Dumptor will also be on display.

● **THE JEFFREY MANUFACTURING** Company's display will be based entirely on a background made up of drive chains. In an original cabinet display, all types of Jeffrey chains will revolve past a window opening.

In addition the company will show a Type B-3 hammermill for crushing stone; also various sizes of belt idlers.

● **THE SMITH ENGINEERING WORKS** will exhibit a working model of a rock crushing plant with a nominal 500 tons per day capacity. This model will include one Telsmith roller bearing jaw crusher as a primary breaker; an elevator; and one double deck pulsator arranged so that the oversize is returned to the Telsmith Gyrasphere secondary crushers.

All units in this model are 1/6 scale models of actual commercial machines. Rock will be crushed for demonstration purposes.

● **PIONEER ENGINEERING WORKS** will have on exhibit and in operation at the Road Show a complete asphalt plant and a complete two unit crushing and screening plant. In addition, there will be shown a number of smaller units, such as the new "Buzzer Screen" type low-cost gravel plant, jaw and roll crushers and screens.

In the gravel and quarry fields, Pioneer has developed a completely new line of portable two unit plants, with the primary crusher (and screen where required) on one chassis and the secondary crusher and screen on a second chassis.

● **R. G. LeTOURNEAU, INC.** will formally introduce for the first time its new post-war equipment line. Several sizes of new Tournapull models, featuring electric control, will be on display.

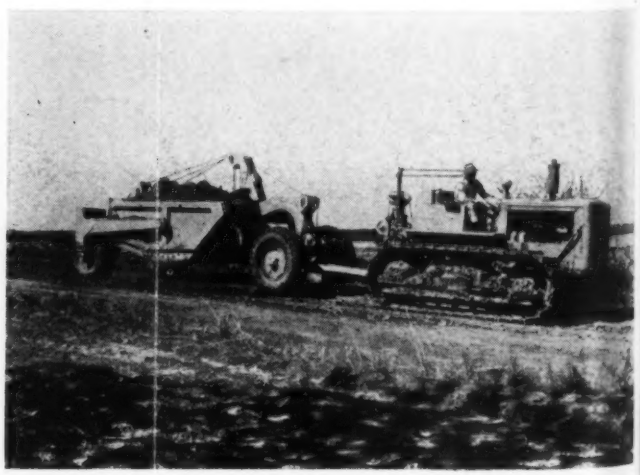
An interesting highlight in showing this new development of electric control will be one machine which visitors can mount and actually operate the finger-tip controls. Other features that will be explained to booth patrons are instantaneous shifting which eliminates the conventional foot clutch, a torque-proportionating differential which brings about a new concept of making maximum use out of drive-wheel power, and giant low pressure tires for increased traction.

Completing the LeTourneau exhibit will be the formal introduction and presentation of the latest developments in high-speed dozer equipment. Named the Tournadozer, it has 4 wheel drive and rolls on giant rubber tires.

● **BUCYRUS-ERIE CO.** will exhibit a full line of tractor equipment for International Industrial crawler tractors at the Road Show. There will also be a photographic display of the company's line of ⅜ to 2½ yard excavators in the Exhibition Hall.

Tractor's attachments in Bucyrus-Erie's outdoor exhibit include; five scrapers; three cable-controlled 4-wheel units—with capacities of 6, 10, and 15 cu. yds. respectively—and two hydraulic-controlled 3½ yd. rear-dump 2-wheel scrapers. There will be two bulldozers for the TD-14 and TD-18 tractors, and two Bullgraders, one cable-controlled for the new TD-24 tractor, the other a hydraulic-controlled unit for the TD-9. One Dozer-Shovel, mounted on a TD-6 tractor, will be shown. Also displayed will be two P-25 rear-mounted powercontrol winches and one front-mounted P-15 winch, designed for TD-24 bulldozer or Bullgrader control.

The new Pioneer 2-unit plant set up for crushing rock.



Bucyrus-Erie 6-cu. yd. scraper working with an International tractor.

● **THE INTERNATIONAL HARVESTER** exhibit will be reminiscent of the company's "Hundred Years in Chicago" exposition which attracted 500,000 people to these grounds last September.

Score of individual displays, including diesel and gasoline-powered trucks, tractors and power units, will provide an overall picture of what is new in the way of automotive and industrial power equipment. All International tractors will be shown with matched equipment. All of the trucks will be equipped for specific types of work. This will be of particular interest to users and operators who will see the equipment as a complete unit, and not merely as a prime mover or power unit which must be adapted to their special needs.

● **AUSTIN-WESTERN** will feature the "101," the largest single unit in the company's line of portable crushing and screening plants. It uses a 10 x 36 jaw crusher and a 30 x 18 roll crusher in connection with matched screens and conveyors. Every part in the plant is balanced to insure continuous production of crushed and screened aggregate in controlled sizes. Capacities range from 100 to 200 or more tons per hour. This unit will be shown at the Road Show.

● **GENERAL MOTORS** will exhibit its Series 74 diesel engines. Feature of the exhibit is a Twin-4 236-hp. multiple engine unit (Model 8103). It was formally introduced to the trade in the early part of April. The Twin-4 consists of two 4-cylinder engines mounted together on a common base and geared to a single output shaft. Transfer gear cases are obtainable with gear ratios of 1 to 1, 1.33 to 1, 1.76 to 1 or 2 to 1. Throttle and clutch control mechanisms are such as to permit the engines to be operated singly or as a synchronized pair. Four different power take-off arrangements are available as options, thus giving the unit the maximum inapplication flexibility. It is expected that this model will attract considerable favor with 2 and 3 yd. excavator people.

Visitors to the GM booth will be able to observe an interesting and instructional motion picture film titled "Diesel, The Modern Power" as well as a demonstration of the General Motors unit fuel injection system. Another highlight planned for Detroit Diesel's exhibit is a chromium plated rotating cutaway of a 3-cylinder General Motors Series 71 Diesel engine. Electrically driven, the unit is so constructed that all moving parts actually operate in full view of the spectators.

● **THE MARION POWER SHOVEL** Company will show two post-war machines at the 1948 Road Show—the 111M and the 33M.

The Marion 111M meets the needs of large contractors for a combination of big dipper capacity in a machine comparatively easy to move from job to job. It is essentially a clutch type diesel machine but has the extra advantage of electric swing. A generator, direct connected to the driveshaft of the diesel engine, provides power for the vertical electric swing motor.

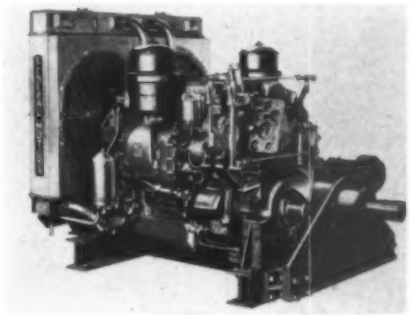
The 33-M is the smallest machine in the Marion line of shovels. It can be converted quickly and easily for use as a shovel, dragline, clamshell, crane, or pull shovel.

● **THE ERIE STEEL** Construction Company's display will include a Strayer portable concrete plant which will be in working operation. Ramps will be provided for visitors to inspect each station of operation.

Popular sizes of Erie Barge and Hard Digger types of buckets will also be shown.

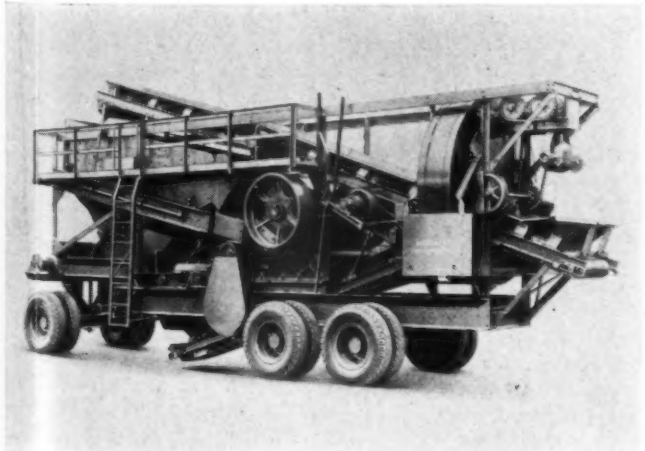
● **GRUENDLER CRUSHER** and Pulverizer Co. plans to exhibit at the Road Show one-eighth scale models of its various crushing equipment. In order that visitors may inspect the insides of the various units, outside plates are made of transparent plastic.

International 6-wheel truck with heavy-duty dump body.



General Motors Series 74 twin-4 diesel engine with heavy-duty power take-off.

Erie Hard Digger 2-line clamshell bucket.



Austin-Western's 101 portable crushing and screening plant.

Marion 111M shovel working in a stone quarry.

AT THE BIGGEST SHOW ON EARTH

● **UNIT CRANE & SHOVEL CORP.,** manufactures ½ and ¾ yd. excavators and cranes with capacities up to 15 tons Units are crawler mounted, self-propelled (rubber-tired) types, or truck mounted. All models are completely convertible to all attachments, full swing, and powered by either gas or diesel engines. Several models will be exhibited at the show.

● **C.I.T. CORPORATION,** in order to serve their host of contractor, distributor and manufacturing clients, will use a specially built display booth. A cordial invitation is extended to members of the construction industry to make it a port of call.

Company representatives from all parts of the country will be in daily attendance to meet clients, answer questions and render on-the-spot financing service to construction men who visit the "Big Show."

In a recent interview, E. T. Neville, National Sales Director of the Corporation disclosed that in 1947 alone, his company financed over fifty million dollars worth of construction equipment. Another record-breaking year is anticipated and C.I.T. will continue to provide financing facilities for both contractors and distributors.

● **AT THE LE ROI** exhibit visitors will be shown exclusive features in the Airmaster line of compressors such as the patented Econotrol, an automatic control for saving fuel by adjusting engine speeds to the demand for air; intake, discharge, high and low pressure valves that are 100 percent interchangeable; intercooler design, guaranteeing drier, cooler, oil-free air; automotive steering and semi-elliptical spring suspension.

The popular Trac-Jac, a completely integral, completely mobile, tractor-compressor, will be exhibited. Trac-Jac is an exclusive Le Roi development bringing 105 c.f.m. of compressed air to job sites heretofore considered inaccessible.

● **THE DIAMOND IRON WORKS,** Inc. will show its latest No. 66 Portable Rotor lift crushing plant at the Chicago road show. Produced since the turn of the year, this model is in use in a number of locations in the country. It is a high production machine, geared to produce 150 yards of stone per hour. The 10 x 36 Diamond jaw crusher and 30 x 18 roll crusher units are integral in this straight line model. It is available in 5th wheel design for truck-tractor hauling where maximum moveability is desired.

● **BARBER-GREENE CO.,** manufacturer of road building, conveying and loading equipment, plans the largest exhibit in the company's history. The equipment exhibit will also include full color movies of B-G equipment in action.

In the Barber-Greene display, set up and ready to work, will be the new B-G Model 845 "Utility" bituminous plant. Complementing this will be a Barber-Greene Model 879A tamping-leveling finisher for properly laying a compact level course of bituminous mix without the use of forms.

In the display of B-G bucket Loaders will be the new Model 545A, the Model 82A crawler mounted bucket loader, and the Model 522.

The Barber-Greene line of belt conveyors and equipment also will be represented. The permanent conveyor unit on display will illustrate B-G "standardized" design. Bulwarking this display of conveyors will be the new Barber-Greene heavy-duty portable belt conveyor.

● **LIMA SHOVEL** and Crane division will participate in the 1948 Road Show with two machines, a shovel and a dragline. They will be exhibited in such a manner that visitors will have an opportunity to make a thorough inspection of their many important features. Lima officials and others from the company in attendance during the show will have their headquarters in the Stevens Hotel.

● **THE NEW MODEL ZU FWD** truck announced in May, by the Four Wheel Drive Auto Company will be exhibited for the first time at the road show.

The new truck has a rating of 33,000 lbs. gross vehicle weight and has a number of new advanced design features which will be of special interest to all visitors.

The Model ZU is powered by a 500 cu. in. high compression gasoline engine. The engine develops 188 hp. at 2,060 r.p.m. governed speed and 460 ft. pounds of torque at 1,000 r.p.m. All engine accessories are located to provide easy adjustment.

● **THE KWIK-MIX CO.** will show two new tools recently added to its line of cement, bituminous and plaster-mortar mixers.

A new power wheelbarrow will be shown for the first time. This new wheelbarrow has a differential on front axle, travels under power for forward and reverse, and has speeds from 2 to 6 m.p.h.

In addition to its 6-S, 11-S and 16-S concrete mixers, Kwik-Mix Company will introduce a new type, non-tilting 3½-S Dandie cement mixer.

● **THE EUCLID** exhibit will be located on the South Concourse and it will cover an area of approximately 44,000 square feet.

A total of 24 units will be shown, including rear-dump, side-dump and bottom-dump hauling units, as well as the Euclid Loader. Many of these models are new developments displayed for the first time. There will also be several cutaway displays of component parts. A large staff of engineering, service and sales personnel will be on hand to provide technical information on the new Euclid models and developments.

● **BAY CITY SHOVELS, INC.,** will feature three machines at the 1948 Road Show. Included in the exhibit will be Models 180-T66 CraneMobile, Model 30 Back-Hoe and Model 65 Shovel.

The model 180-T66 CraneMobile, which is a rubber tire mounted 20-ton capacity crane, is equipped to handle booms and jib up to 110 ft. Crane machinery is mounted on a specially designed carrier unit of the 3-axle type, all-wheel drive powered by Waukesha 6-cyl. gasoline engine with 770 cu. in. displacement. While carrier is engineered for crane service, it includes standard automotive parts such as Timken-Detroit axles, Spicer transmissions, Ross steering gear, Budd wheels and Timken-Westinghouse air brakes. This machine, while essentially an erecting crane, may also be used for clamshell or dragline operation.

● **THE BROOKS** Load Lugger which will be on display is easily installed on any standard truck. According to the manufacturer, there is a Brooks container for every type of materials handling job, whether it be hauling road rock, transporting concrete blocks, air-entrained concrete, or liquids.

Some of the special uses of Brooks Load Luggers include the moving of concrete from mixer to site, skid loading of heavy solids, and transportation of liquids. All containers are interchangeable. In addition, the hoisting mechanism, when fitted with a crane boom, can be used as a portable crane for handling pipe sections, removing small boulders and similar jobs.

● **WILLIAMS** Patent Crusher and Pulverizer Co. will introduce a new and unusually large hammermill at the Road Show.

Known as the "Super-Slugger," this mill is aimed for duty in cement plants and other stone quarries requiring high tonnage output. Model 445 will take stone from a 1¼ yd. shovel and reduce it to 2 in., 1¼ in., or ¾ in. in one operation.

● **LINK-BELT** invites visitors to see a picturization of the Link-Belt Speeder Shovel-Crane in its booth at the Road Builders Show.

Condensed in easy-to-follow colored motion pictures are dozens of "on the job" demonstrations. These pictures have been gathered from large and small jobs in every territory and are shining examples of efficient excavating, grading and profitable applications of road building machinery in general, and Link-Belt Speeder Shovel-Cranes in particular.

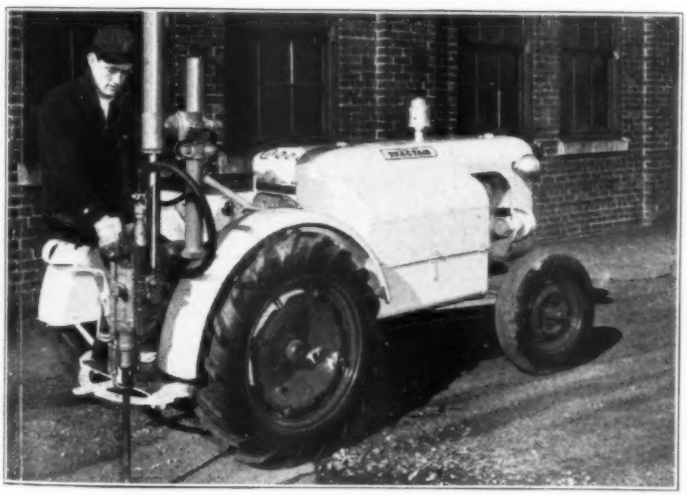
● **THE OWEN BUCKET CO.** will feature a representative display of Owen clamshell buckets for all purposes, as well as grapples for handling scrap, rocks and pulpwood. One of the many items of interest will be the operating model of the grapple.

Unit 357 self-propelled mobile crane.

Model No. 66 Diamond portable crusher.

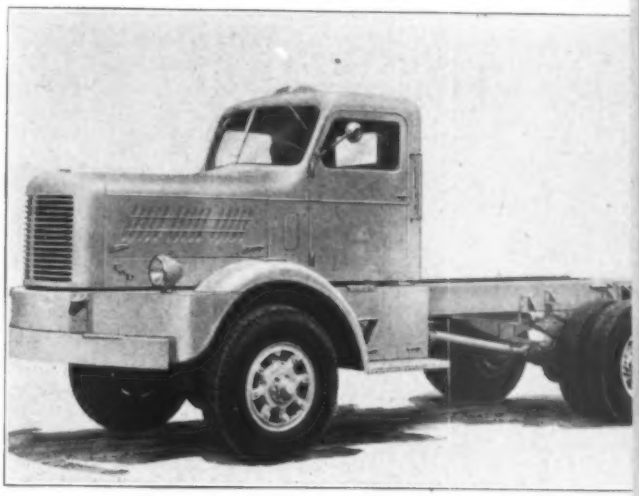
C. I. T.'s booth at the Road Show.

Lima Shovel equipped with 1½ yd. AMSCO dipper.



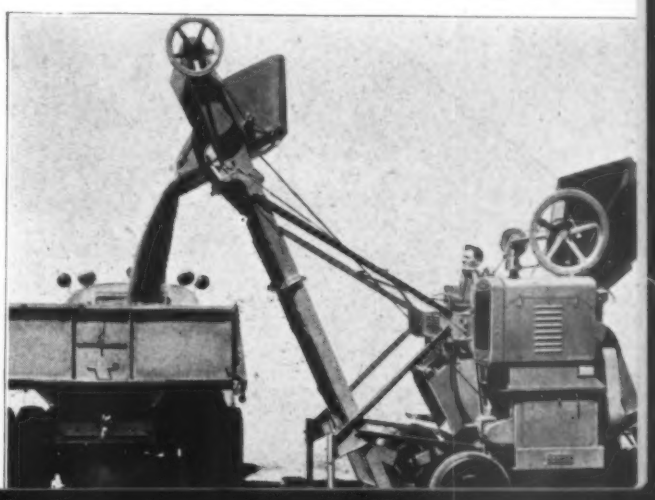
A LeRoi Trac-Jac in drilling position.

Below: Bay City 20-ton CraneMobile.

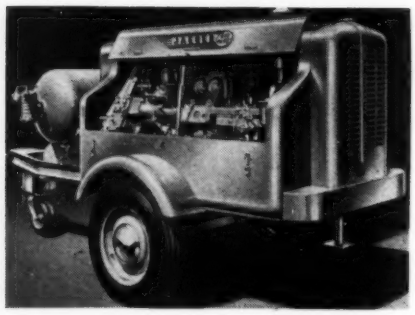


FWD model ZU truck.

Below: Kwik-Mix Model 14 bituminous mixer.

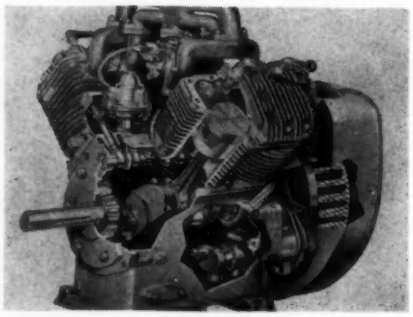


AT THE BIGGEST SHOW ON EARTH



Jaeger's model 125 Air-Plus compressor.

● **JAEGER MACHINE COMPANY** will highspot its demonstration at the show with a complete line of "New Standard" sizes of portable air compressors in 75, 125, 185, 250, 365 and 600 c.f.m. capacities. In addition the company will display their new paving machines, including the new Type "X" Diagonal-Screed Concrete Finisher, new Model BP-5 Bituminous Paver, new Re-Mixing Compacting Concrete Spreaders, and Side Discharge Truck Pavers. Latest model two-speed, hydraulically controlled hoists, dewatering and pressure pumps, building mixers and truck mixers will also be demonstrated.

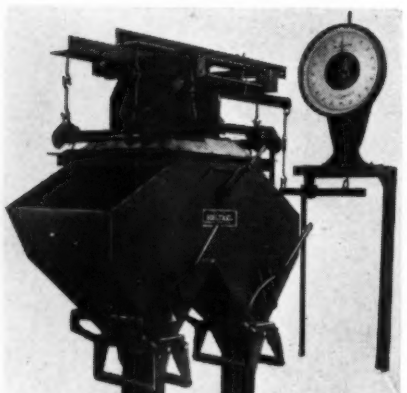


Cutaway model of Wisconsin V-type 4-cylinder engine.

● **THE WISCONSIN MOTOR CORP.** will exhibit the company's entire line of 4-cycle single cylinder, two cylinder, and V-type four cylinder air-cooled engines.

Also included in the Wisconsin Engine exhibit will be cutaway models of all three types of engines manufactured by the company.

The new Models TE and TF 2-cylinder engines, which will be among those shown, are the latest additions to the Wisconsin line. The Model TE has a cu. in. displacement of 45.9, a stroke of 3¼ in. and an r.p.m. range from 1400 to 2600, turning up 7.2 hp. at 1400 r.p.m. and 11.2 hp. at 2600 r.p.m.



Heltzel dual weigh batcher.

● **IOWA MANUFACTURING** Company's exhibit will present as a feature the Cedarapids Unitized Plant. A Unitized Plant consists of four basic units which can be used separately or in any combination depending upon the finished products desired and the pit or quarry available.

One of the advantages of the Unitized Plant is that units can be purchased individually, starting with a secondary crushing unit which is a gravel crushing and screening plant. Then as demands for other aggregates increase, the other units can be added.

Each unit can be equipped with gasoline, diesel or electric power depending upon individual preference.

The company will also display the Cedarapids Patchmaster, and a portable, continuous bituminous mixing plant with a capacity of 20 to 30 tons of mix per hour.

● **THE HELTZEL STEEL FORM** and Iron Company exhibit will be featured by dual weigh batchers for faster batch truck operations.

Dual batchers are the most recent Helco design for quick aggregate and cement handling. By eliminating one or more truck stops at aggregate and bulk cement plants, Heltzel dual batchers provide the fastest material handling service possible for highway contractors.

Both the dual aggregate batcher and the dual cement batcher will be exhibited at the Road Show.

● **THE WORTHINGTON PUMP** and Machinery Corp. and its subsidiary, the Ransome Machinery Co., will exhibit the entire line of Blue Brute construction equipment. Approximately seven carloads of machinery and displays will be shipped into Chicago for the company's display which will occupy an area of 9800 sq. ft.

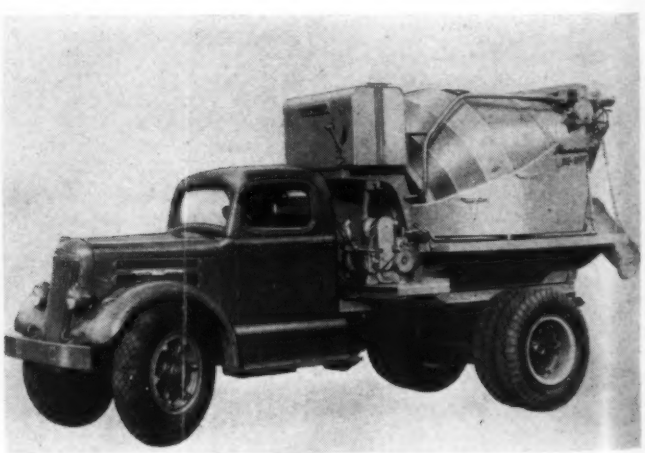
Equipment exhibited will include models of the Blue Brute line of portable air compressors, rock drills, air tools, drifters, pumps, and utility compressors. The Ransome Machinery Co. will show its portable concrete mixers, truckmixers, and paving machines.

Much of the equipment exhibited will be operated, including the Dual Drum Paver which is over 71 ft. long, 25 ft. high, and weighs approximately 28 tons.

● **CONCRETE TRANSPORT MIXER** Co. will exhibit both its transport truck mixer and its Hi-Lo truck mixer.

The mixing assembly of the Hi-Lo unit is cut in half and offset as half-moon sections on the shaft. Each half has breaker bars located at intervals on the chord to provide mixing action on the drum's outer circumference. Drive power is transmitted from the truck engine by means of a power take-off.

Cedarapids Unitized Plant.



Ransome's Hi-Up transit mixer.

● **INGERSOLL-RAND** will show its new self-propelled rock drill designed for strip, open pit mining and quarry work. Known as the Quarrymaster, this machine is a completely self-contained unit consisting of a drill, compressor plant, propulsion equipment, and accessories.

The Quarrymaster is easily maneuverable, collars a hole with ease, and drills up to 6 in. in diameter and up to 70 ft. in depth. Mounting an air-operated, piston type rock drill that strikes more than 200 blows per minute, the unit has an unusually high rate of rock penetration. A patented valve action and power cycle insures maximum efficiency and drilling speed, while maintenance is reduced to a minimum by utilizing a cushion of air to bring the piston to rest before it can strike the front head.

The company will also display a new lightweight wagon drill.

● **WINCH-LIFT INC.,** organized by a sand and gravel operator in Minden, Louisiana, has stepped out in the field of hauling equipment with a new design known as the Winch-Lift Trailer. This new trailer is said to eliminate the need for hydraulics, heavy frames and supports.

The lifting principle incorporated in Winch-Lift gives maximum stress equalization throughout the entire unit. A simple block and tackle system operated by a power winch draws the rear carriage forward. The pivot arms automatically raise it to the dumping position. The new trailer will unload at any angle up to a full jack-knife position making this versatile hauler ideal for spot dumping as well as sump dumping.

● **THE UNIVERSAL** 546-P Portable Primary Crushing Unit, which will be displayed at the 1948 Road Show, is one of the most popular units in the Universal line of portable crushing equipment.

The 546-P is widely used to step up the output of any one-stage quarry plant or to convert a gravel plant to a rock plant. It is often used as a part of a quarry plant for primary reduction, eliminating the necessity of sledging or pop-shotting of larger stone.

The 546-P is available in four crusher sizes—1824, 2036, 2436, and 3042.

● **THE WELLMAN ENGINEERING CO.** proposes to exhibit three multiple rope type buckets and two dragline buckets.

The company's 40 MR, multiple rope rehandler, and the dragline bucket, Payload Attachment, have never been exhibited before.

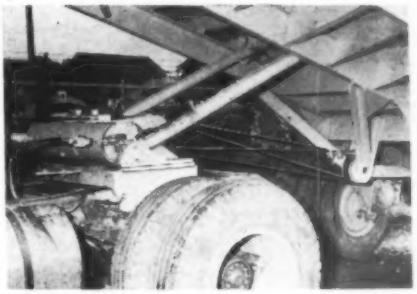
● **THE C. S. JOHNSON CO.** will preview its new Lo-Bin trolley batcher. With its low overall height of 7½ ft., it is easily charged from shovel or front-end tractor loader, as well as by clam or dragline. It has two compartments with two fill valves under each. With hopper extension panels, it measures 9½ ft. high, and stores up to 30 tons. The legs are adjustable so bin and batcher can be raised or lowered in a range of 18 in. With legs removed, the lower main bin section measures 6 ft. wide, 3 ft. 9 in. high, and 14 ft. long.

● **THE DUMPCRETE DIVISION** of Maxon Construction Co., will have on exhibit a working scale model of their Dumpcrete 5 on a truck chassis.

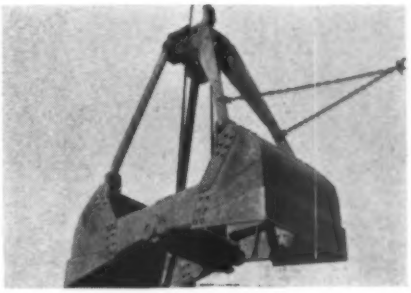
The Dumpcrete is a specially designed dump body to haul and place air-entrained concrete without agitation. It is now being used to place concrete for highway and bridge construction, industrial and commercial buildings, housing projects, power plants, dams, locks and irrigation projects.

● **THREE NEW THOR** pneumatic contractors tools, two of them scheduled for their first public showing, will be exhibited by Independent Pneumatic Tool Company at the Road Show.

The newest addition to the Thor line will be the new Thor Wagon Drill, now in production at the company's Los Angeles works.

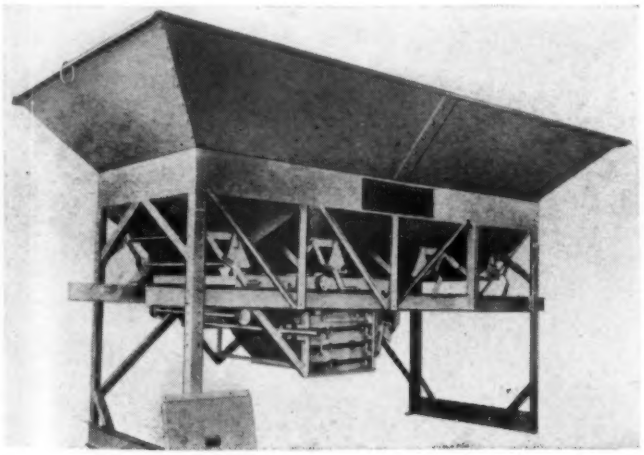


The new Winch-Lift trailer.

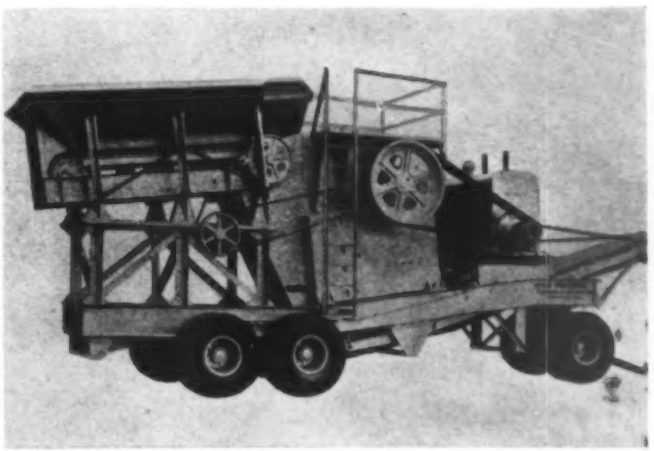


Wellman multiple rope rehandler bucket.

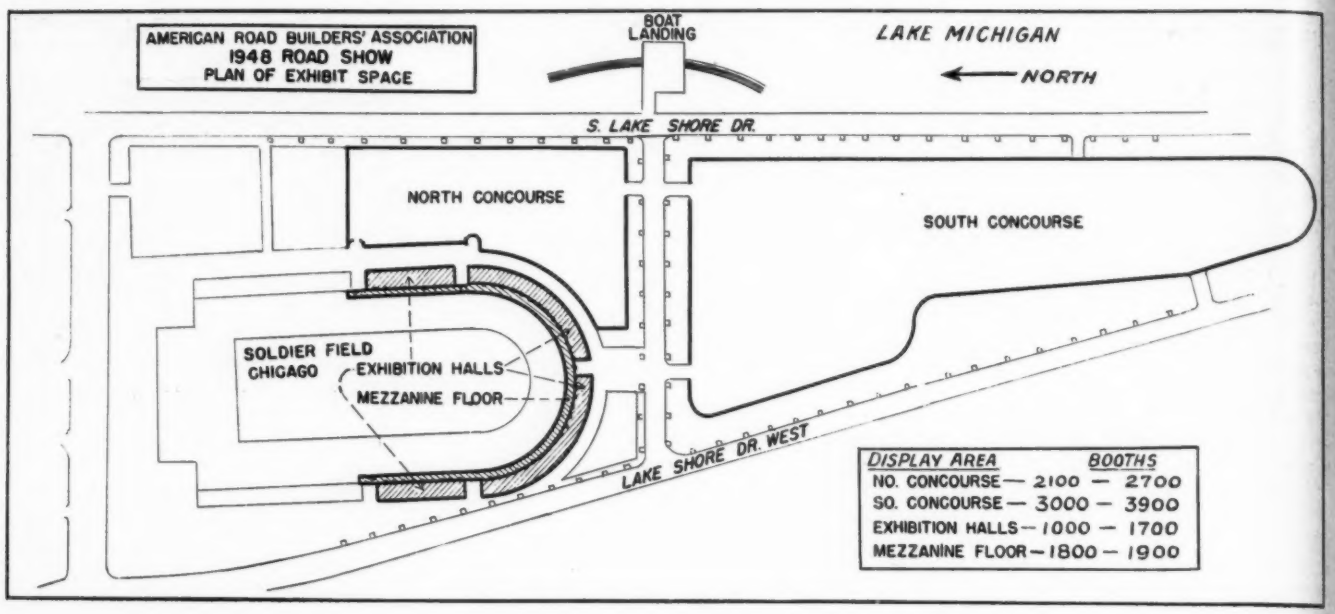
Ingersoll-Rand's new Quarrymaster drill.



A Johnson Lo-Bin batcher.



Universal model 546-P portable crushing unit.



Key to Road Show Exhibits

Exhibitor	Booth No.
Acme Iron Works	3850
Adams Manufacturing Co., J. D.	2905
Aeroil Prod. Co. Inc.	3812
Aeroquip Corp.	4504
Allen Industrial Prods., Inc.	3210
Allis Chalmers Mfg. Co.	3204, 3401, 3601
American Bosch Corp.	1010, 1211
American Chain & Cable Co. Inc.	1232
American City Magazine	1238
American Hoist & Derrick Co.	3219
American Manganese Steel Div. of American Brake Shoe Co.	1024, 1225, 2102
American Road Equipment Co.	2207
American Steel Dredge Co. Inc. Wayne-Crane Division	3836
American Tractor Equipment Corp.	2207
Auto Gear & Parts Co., Inc.	*
Anchor Coupling Co.	1614
Anderson Engineering Co.	3304
Anthony Co.	3810, 2207
Armco Drainage & Metal Prods., Inc.	3804
Asphalt Institute, The	1402
Asphalt Process Co.	1210
Athey Products Corp.	3208
Austin-Western Co.	2412, 2611
Baker Manufacturing Co., The	3112
Barber-Greene Co.	1240, 2203
Barco Manufacturing Co.	3862
Barrett Div., Allied Chemical & Dye Corp.	1222
Bay City Shovels, Inc.	3874
Be-Ge Manufacturing Co.	3304, 3825
Bell Aircraft Corp.	4303
Bethlehem Steel Co., Inc.	1603
Better Roads	1000
Black & Decker Manufacturing Co.	1005
Blackhawk Manufacturing Co.	1230
Blaw-Knox Company	3104
Blue Book of Southern Progress	1200
Broderick & Bascom Rope Co.	1208
Brooks Equipment & Manufacturing Co.	3822
Bros Boiler & Mfg. Co., Wm.	3009
Bucyrus-Erie Co.	1018, 2502, 3866
Buda Co., The	2404, 2603
Buffalo Springfield Roller Co.	2612
Butler Bin Co.	3015
Buttenheim-Dix Publishing Co.	1238
Calcium Chloride Assn.	2108
Caminos y Calles	1016, 1217
Carey Mfg. Co., The Philip	1021
Carter Company, Ralph B.	1403
Carver Pump Co.	3823
Case Company, J. I.	3304
Caterpillar Tractor Co.	3208, 3805
Chain Belt Co.	2406, 2605
C. H. & E. Manufacturing Co.	1607
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Chicago Rawhide Manufacturing Co.	1023
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C. I. T. Corp.	1220
Cleaver-Brooks Co.	2602
Cleveland Trencher Co.	3817
Commercial Shearing & Stamping Co.	1830
Concrete Transport Mixer Co.	3854
Construction Machinery Co.	3018, 3211
Construction Methods	3832
Construction Monthly	1200
Continental Motors Corp.	1417, 1609
Contractors & Engineers Monthly	1238
Contractors Machinery Co. Inc.	2207
Cummer & Son Company, The F. D.	1866
Cummins Engine Co. Inc.	1011
D-A Lubricant Co. Inc.	1035
Daily Construction Bulletin	1200
Davey Compressor Co.	3870
Daybrook Hydraulic Corp.	3027
Dempster Bros. Inc.	3210
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.	1001
Detroit Harvester Co.	3204, 3304
Diamond Iron Works, Inc.	3830
Diamond T Motor Car Co.	3028
Dotmar Industries, Inc.	3232
Drott Manufacturing Corp.	3842
Dumprete Div., Maxon Construction Co. Inc.	1858
Duplex Truck Co.	4108
Eagle Crusher Co., Inc.	3222
Eastman Mfg. Co.	1844
Electric Steel Foundry Co.	3844
Electric Tamper & Equipment Co.	1407, 2610
Electric Wheel Company	1029
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Euclid Road Machinery Co., The	3002, 3201
Evans Winches, Inc., Al	1007-A
Fairbanks, Morse & Company	1206
Felker Manufacturing Co.	4506
Findlay Division, Gar Wood Industries, Inc.	3603
Fiske Bros., Refining Co., Lubriplate Div.	1842
Foote Company, Inc., The	3106
Ford Motor Company, Truck & Fleet Sales Dept.	3006
Fort Pitt Bridge Works	1824
Four Wheel Drive Auto Co.	2620
Frink Sno-Plows, Inc.	2207
Fuller Manufacturing Co.	1224
Galion Allsteel Body Co., The	1012, 1213
Galion Iron Works & Mfg. Co.	2206, 2607
Gardner Denver Company	2604
Garlock Packing Co., The	1202
General Excavator Co.	2201
Geneva Metal Wheel Co.	1600-A
Gillette Publishing Company	1016, 1217
Gilson Brothers Co.	3838
Good Roads Machinery Corp.	3011
Gorman-Rupp Co.	3021
Grace Manufacturing Co., W. E.	3860
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Ingersoll-Rand Company	3108
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Klauer Manufacturing Co.	3229
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Koppers Co. Inc. — Tar Products Div.	1015
Kwik-Mix Company	3203
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Marlow Pumps	1612
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Owen Bucket Co.	3634
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Pettibone Mulliken Corp.	2618-A
Pioneer Engineering Works	3301
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Public Works Magazine	1203
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Ready-Power Co.	2207
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Rogers Brothers Corp.	3864
Rogers Iron Works Co.	3840
Rome Grader & Machy. Div.	3024
Root Spring Scraper Co.	4106
Rosco Manufacturing Co.	3007
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Sauerman Bros. Inc.	1405
Schield Bantam Co.	3026
Schramm, Inc.	3201-A, 3212
Seaman Motors, Inc.	3816
Shaw Sales & Service Co.	3017
Shunk Manufacturing Co.	1820
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Sinclair Refining Co.	1226
Sisalkraft Co., The	1606
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Timken Roller Bearing Co.	1419, 1618
Toncan Culvert Manufacturers Assn.	1004
Toro Manufacturing Corp.	3032
Trackson Co.	3208, 3805
Tractomotive Corp.	3204
Transmission & Gear Co.	1401, 1602
Transport Trailers, Inc.	4308
Truck Engineering Co.	2207
Truckstell Mfg. Co.	1040
Twin Disc Clutch Co.	1212
Tyson Bearing Corp.	1228
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Union Wire Rope Corp.	1028, 1229, 1231
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Universal Engineering Corp.	1412, 2616
Vickers Inc.	1404
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Walter Motor Truck Co.	2608
Warner & Swasey Co.—Gradall Div.	3821
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Wellman Engineering Co., The, Bucket & Trailer Dept.	3808
Wellman Co., The S. K.	1236
White Manufacturing Co.	3065
White Motor Co.	3620
Whiteman Manufacturing Co.	3848
Whitney Chain & Mfg. Co.	1604
Wico Electric Co.	1810
Willett Manufacturing Co.	2110
Williams Form Engineering Corp.	1822
Williams Patent Crusher & Pulverizer Co.	3969
Winch-Lift, Inc.	3236
Wire Reinforcement Institute	1205
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Wood Industries, Inc., Gar	3206, 3403, 3603
Wooldridge Manufacturing Co.	1856, 3008
World Construction	1016, 1217
Worthington Pump & Machinery Corp., Construction Equipment Dept.	3014, 3207
Yaun Welding & Dragline Buckets, Inc.	3858

*Booth numbers not yet allotted.

• Trommel screens in the desliming section are believed to be the first ever used for such fine sizing (⅝ mm.). Wedge bar panels are of stainless steel. High-pressure sprays prevent blinding.

Noralyn Mine

(*From page* 70)

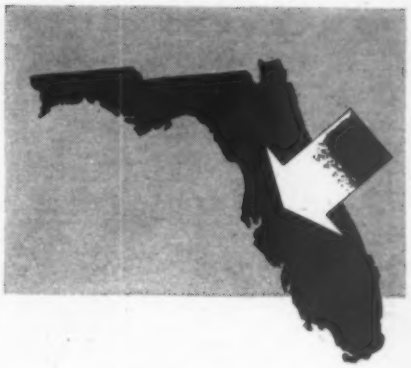
from three Georgia Iron Works 6-in. hydraulic guns mounted on the rim of the pit, sluice the material into the intake pipe of a 12-in. sand pump. For the sluicing operation it is the practice to use return water brought to the mine in an open ditch from either the tailings dam or the slime pond dam. An Allis-Chalmers 200-ft. head single-stage pump supplies the 4,000 g.p.m. used for this purpose.

The company uses both Morris and G.I.W. pumps at Noralyn for moving the matrix from the mine to the washing-plant. At present a Morris pump, driven by a 300-hp. G.E. induction motor, is in service at the mine, and a similar unit is used as a booster about midway in the ¼-mile pipeline from the mine to the washer. Although the pump has a 12-in.-diameter discharge, the line itself is 14-in.-diameter spiral welded pipe.

To keep Noralyn in full production about 5 acres of the property will be mined out every month. At this rate the 2,000-acre tract would be adequate for about 33 years of full-scale operations, but the company prefers to talk in terms of a minimum of 25 years. Both the mine and the plant operate on a three-shift basis seven days per week. So far no regular maintenance schedule has been established, but undoubtedly one shift per week will be allowed for necessary repairs and general maintenance work. As insurance against interruptions in the mining operation, the designers have provided 20,000 tons of feed storage capacity ahead of the flotation section, or enough so that the plant can operate for 48 hours without feed from the mine.

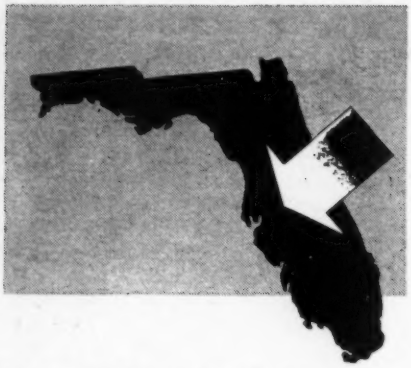
Washer The washer is a standard low-head installation designed by R. B. Fuller, manager of International's Florida operations. Its outstanding feature is the incorporation of three identical parallel flows which are usable in any combination. Under normal conditions the center unit is held as a standby, since two of the lines are more than adequate to handle the full flow.

The flow sequence in any one of the washer units is as follows: The water-borne matrix is discharged on a slotted flat gravity screen at the head of the line. The undersized material washed through this screen goes directly to a 175-ft. General American hydroseparator, while the oversize flows by gravity into a single-shell trommel screen. Over-



• An open ditch carries slimes from the plant to a pumping station, where they are boosted into the slime pond dam.

• The pumping station for boosting slimes. The unit in the foreground is a 16- by 16-in. sand pump, the other a 30-by 24-in. mixed-flow pump with a capacity of 25,000 g.p.m.

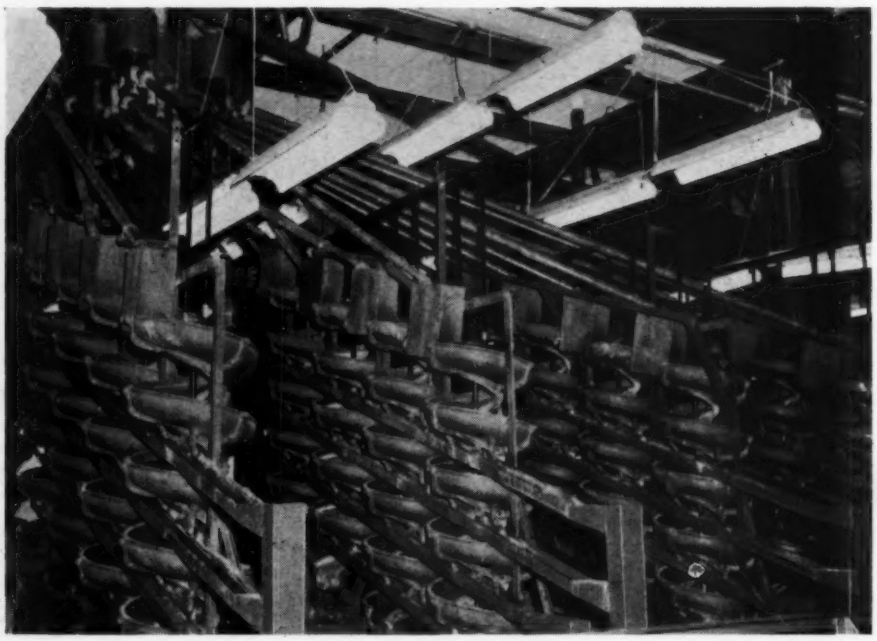


size from the trommel drops on a belt conveyor and is discharged into a Jeffrey hammermill where it is reduced and pumped back to the feed end of the washer. One hammermill is sufficient to handle the entire plant, but a second identical unit is in the circuit for standby service.

Trommel undersize goes to a double-deck Allis-Chalmers vibrating screen where plus ½-in. material is removed on the upper deck and routed to the hammermill. A split is made on the bottom deck with the undersize going to the G.I.W. debris pump and the oversize to a G.I.W. log washer. Subsequent units in the flow are a single-deck vibrating screen, a second log washer, another vibrating screen, and a ⅜-in. single-deck vibrating screen. In each instance the underflow from the washers and the fine material go to the debris pump, while the log washer products and the screen oversize flow uninterruptedly through the plant.

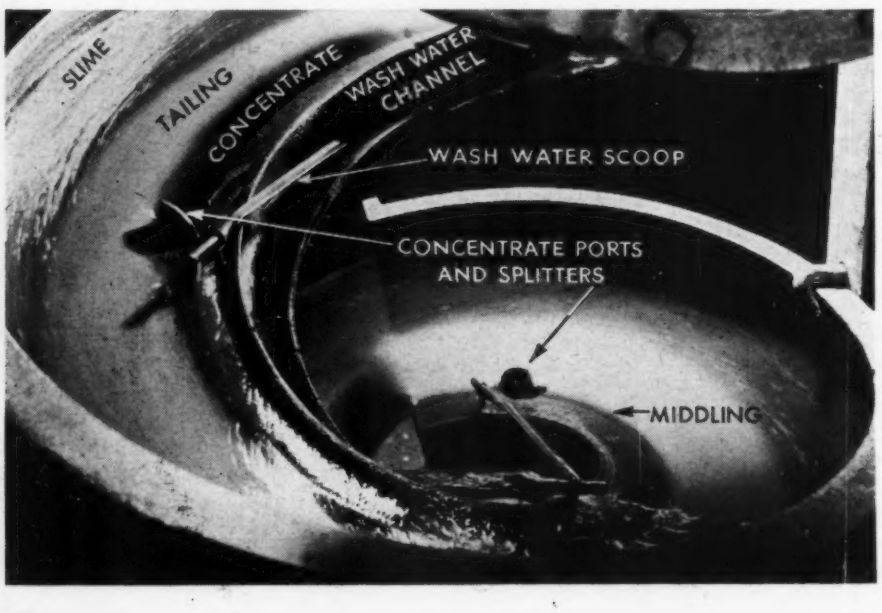
In the main it is the function of the washer section to effect preliminary sizing in the plant feed, with the minus fraction (designated as washer debris) being pumped to the 175-ft. hydroseparator, and the plus fractions (designated as pebble phosphate) going into car loading bins as a finished product. In addition, however, a split at ⅜-in. is made in the pebble product, and the coarse fraction (about 10 percent of the total) is stored separately for shipment to the electric furnace market.

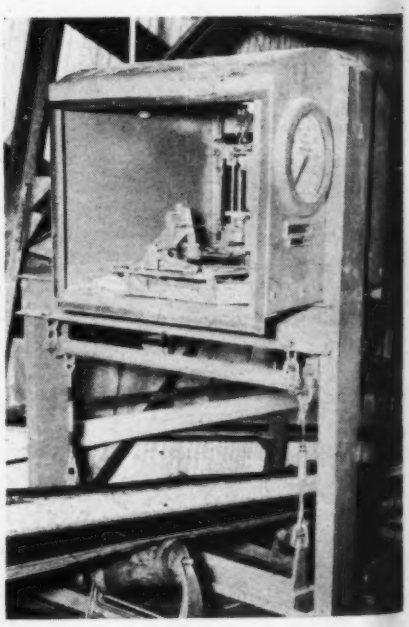
Slime Pond One of the most serious and costly problems in large phosphate operations is that of slime disposal. At Noralyn a 480-acre settling pond, probably the largest ever used in the phosphate industry, has been built some four miles from the plant proper, in anticipation of having to store approximately 1,000,000 tons of slimes annually. The pond is fed from the plant by an open ditch, through which the slimes flow by gravity to a pumping station at the settling area. A 30- by 24-in. Morris mixed-flow pump with a capacity of 25,000 g.p.m. handles the entire flow, but there is also a 15-in. sand pump available as a standby unit. Clear water at the far end of the pond flows over a spillway and is returned to the plant for re-use. Noralyn's requirement of approximately 40,000 g.p.m. of clear water makes recovery and re-use an important consideration.



• Humphreys spirals, in which the coarser fraction of flotation feed is treated by agglomerate flotation.

• Below: A detail view showing the action of the Humphreys spiral.





• The recording weighmeter by means of which the spiral feed, in dry tons per hour, is continuously recorded. This will yield data for the correlation of reagent consumption with tonnage.

Thickeners . As an additional aid in water recovery, and to cut down on the volume of slime, two of the largest thickeners ever built have been installed at Noralyn. These 383-ft. giants incorporate a new design principle developed by General American. There are two long traction arms and four short arms revolving at a higher speed at the center, with all power supplied by the traction on the long arms. They take a feed of 25,000 g.p.m. of water and slime with about one percent solids present, which is siphoned in at a point about 12 ft. below the surface to prevent disturbance of the settling at the center. The clear water overflow (15- to 20,000-g.p.m.) is returned for re-use while the underflow goes to the mud pond area for settling.

In the water circulation system for Noralyn the mud pond overflow, overflow from the two thickeners and the water from the deep wells feed a large storage reservoir. A canal leads from the reservoir to a pool which acts as a sump for the water supply pumps. With the ponds and the thickeners delivering at full capacity only one of the three deep well turbine pumps will probably be required to supply the plant with water.

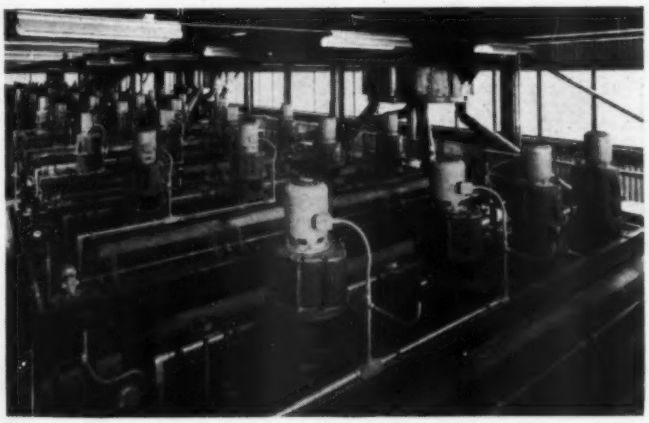
Desliming Section In addition to removing slimes the desliming section serves to split the underflow of the 175-ft. hydroseparator into two fractions—which feed the spiral and flotation sections. The underflow of the 175-ft. hydroseparator, which we understand is the first traction machine of this type to be used in the phosphate industry, is pumped to Akins duplex screw classifiers. These machines overflow flotation feed to an 85-ft. hydroseparator where the desliming process is continued.

The discharge (or rake product) of the Akins classifiers is sized in screens. The undersize from the screens goes to the 85-ft. hydroseparator, while the oversize goes to a second group of screens. Following this final washing and screening operation the oversize material is diluted and pumped to two spiral

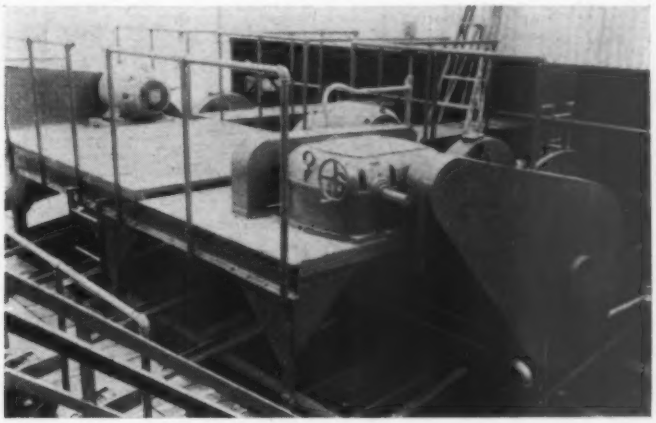
feed storage bins.

In the desliming circuit for flotation feed, the finer material overflowing the Akins classifier goes to an 85-ft. hydroseparator. The 85-ft. hydroseparator alone overflows to the two thickeners. The 175-ft. unit overflows entirely to the slime settling pond.

The 85-ft. hydroseparator underflows into a sump from which the pulp is pumped to a 50-ft. hydroseparator mounted on steel columns above the flotation feed storage bins. Additional desliming on the flotation

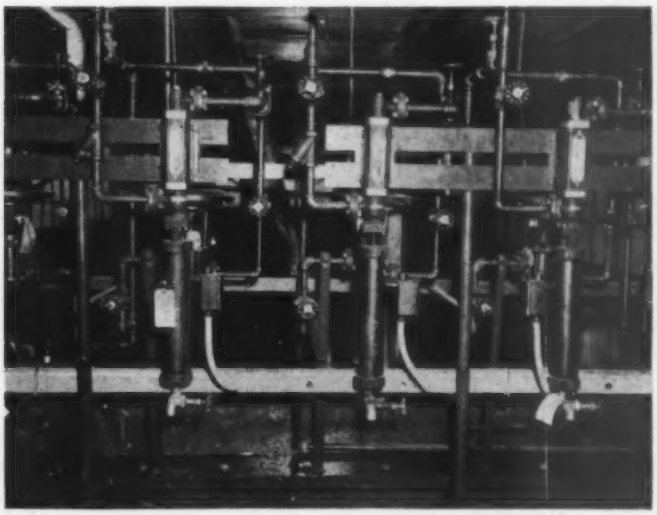


• All rougher cells in the flotation section are turbo units of the type shown here.



• The 20- by 42- by 28-ft. bowl classifier which feeds minus 28-mesh plus 200-mesh material to the flotation plant.

• Tanks for storage of reagents used in the flotation process. The building in the background is used for storing bulk materials.



• Reagents are fed through recording rotometers, giving accurate control and a permanent record of the reagent combination used.

field is accomplished in the 50-ft. hydroseparator. From here the 1,500-ton storage tanks are fed by gravity.

In connection with each of the various processing operations just described it should be pointed out that the term "slimes" in phosphate operations refers to very fine material from which additional recovery is not economically feasible. The presence of slime in very fine flotation feed results in a considerable increase in the quantities of reagents consumed in recovery.

Spiral Section The coarser fraction of feed is treated in Humphreys Spiral Concentrators. These units, which International has used with good success in its phosphate operations at Achan, Fla., consist of spiral conduits to which ore pulp is fed at the top. As the ore flows downward the heavier particles concentrate in a band along the inner side of the pulp stream. Wash water, which is added at the inner edge of the stream, flows outwardly across the concentrate band. In the Noralyn installation the tailings from both groups go to a 54-in. Akins single-screw classifier.

Flotation Section In the flotation section a double float similar to that at International's Peace Valley plant is used, with first a fatty acid float for phosphate and then an amine float for silica. Both Turbo and Denver flotation cells are used.

The end product of the flotation section, which is stored in three 1000-ton car-loading bins, runs 77 to 78 percent bone phosphate of lime equivalent. The washer and desliming sections save about 75 percent of the matrix, or virtually all of the plus 200-mesh phosphate rock contained in the ore. Theoretically pure phosphate at Noralyn would run 83 or 84 percent bone phosphate of lime, the remainder consisting of clay, insoluble material (largely SiO_2), and small amounts of iron, alumina and other heavy minerals. Noralyn's washer pebble product runs 72 to 74 percent b.p.l.

Tailings from both the spiral and the flotation sections are stored in a settling pond adjacent to the plant. Their b.p.l. content runs 5 percent or less. They are stored separately from the slimes because they settle much more rapidly, and the water can thus be recovered and reused more quickly.

Reagents The reagents used in the spiral and flotation sections at Noralyn are stored in nine outdoor tanks ranging in capacity from 22,000 to 184,000 gals. Dry materials are stored in an adjacent warehouse where mixing and blending are also carried on. The materials are pumped to six constant-head reagent tanks located at the top of the flotation building. Reagent consumption is correlated with tonnage by means of Merrick Weightometers which record the dry tons of feed per hour going to the flotation and the spiral sections.

In the flotation circuit, the feed and the reagents are mixed in conditioners (mixers) arranged in series. These conditioners are fed by an inclined 42-in. Republic Reprene conveyor belt.

In the spiral section the reagents are introduced just ahead of the 30-in. inclined conveyor which feeds the circuit. The feed goes from the 22- by 18-ft. surge bin into an FX duplex rake classifier, and the rake product and the reagents are mixed in a 6- by 16-ft. drum-type mixer.

Amine Flotation The amine circuit employs an inverted flotation, which is to say that calcium phosphate sinks to the bottom of the cells and the silica is floated. Amine acetate is fed to the circuit, and acts as the collector and frother for the silica.

Controls Noralyn is undoubtedly unique in the nonmetallic minerals field in the extent to which automatic controls have been utilized throughout the plant. This is indicated by the long list of functions which are controlled automatically, such as feed tonnages, pump speeds, hydroseparator underflow solids, sump levels, hydraulic lifts on hydroseparator rakes, classifier overflow solids, and so on.

Feed tonnage is controlled by the loads on the feed classifier rakes through thermal converters and Foxboro controls. Similarly all important hydroseparator underflow pumps are controlled by either the load on the rakes or by the percent solids in the underflow. A glassed-in central control room has been provided, with all control units in panels, and from this point in the plant the operation of the thickeners, hydroseparators, underflow pumps, reagents and feed tonnage can all be directed. Manual bypasses have been provided on all automatic controls.

In the electrical installation Westinghouse equipment predominates. Westinghouse control center switch gear is mounted in separate glassed-in rooms which are centrally located in reference to the operating floor. Motors in excess of 50 hp. are 2,300 volts; those under 50 hp. are 440 volts. The connected load at Noralyn is 12,000 kv.a., and there are approximately 450 motors varying in size from 1/20 hp. to 600 hp.

Production As mentioned earlier, the plant is designed to produce 1,500,000 tons a year of phosphate. Try-out operations carried on prior to the formal opening on April 20 indicated that the plant will easily reach this production. Thus Noralyn replaces International's Peace Valley plant as the largest phosphate producing property in the world. It has five times the capacity of International's Mine No. 122, located near Mulberry, Fla., which the Noralyn development was originally intended to replace. As the first long-period plant to be built in the phosphate fields, Noralyn marks the opening of a new era in phosphate production.

The expected output of 4000 tons per day of finished product will probably consist of 500 tons of washer pebble and 3,500 tons of flotation and spiral concentrates. The concentrates will probably be divided in the ratio of seven parts of flotation to one of spiral.

Apart from the mining operation, the plant employs about 20 men on a shift. Spread out over so large a property, this small force is scarcely apparent, and in consequence visitors receive the somewhat eerie impression that the plant is operating itself, which is indeed almost the case.

Credits Construction of the plant was carried out under the general direction of James A. Barr, International's chief engineer, with R. B. Fuller, manager of International's Florida operations, supervising and Lawrence Frye as project engineer. All electrical installation was under the supervision of Turner Loehr, chief engineer of the Florida Phosphate Division.

Jubilee Meeting of Canadian Institute of Mining & Metallurgy Held in Vancouver

another P and Q exclusive

THE Canadian Institute of Mining and Metallurgy held its Jubilee Meeting, commemorating the 50th anniversary of its founding, in Vancouver, B. C., on April 5-8, with headquarters in the Hotel Vancouver. R. W. Diamond, vice-president and general manager of The Consolidated Mining and Smelting Co. of Canada, Ltd., was elected president, succeeding Charles Camsell.

The various divisions of the institute held both business and technical sessions. George K. Foster, vice-president and general manager, Canadian Johns-Manville Co., Ltd., Asbestos, Quebec, was elected chairman of the Industrial Minerals Division, and W. Nowers Asbury, Thetford Mines, Quebec, was elected secretary.

Following the technical sessions, tours by boat and train were made to mining camps in southern British Columbia, where the delegates were entertained royally by the various mining companies.

A number of papers of interest to readers of PIT AND QUARRY were presented before the Industrial Minerals Division.

Industrial Minerals in the Canadian Chemical Industry

Dr. C. H. Wright, chemical engineer, The Consolidated Mining and Smelting Company of Canada, Ltd., in his paper *Industrial Minerals in the Canadian Chemical Industry* made this statement: "The rapidly expanding and increasingly complex Canadian industrial structure, with the mining, metallurgical and chemical industries as a large integral part has, in recent years, brought greatly increased importance and value to our industrial minerals."

Dr. Wright grouped the industrial minerals used in the chemical industry under five headings: the sulphur group, including elemental sulphur, sulphides, gypsum and anhydrite, barite and sodium sulphate; the lime group, including lime rock, dolomite magnesite, apatite, phosphate rock and fluorspar; the salt and alkali group, including common salt, soda ash, sodium nitrate and potash; the carbon group (natural gas, petroleum, coal and coke, and graphite); and a miscellaneous group, including ilmenite, mineral earth, silica, and silicates.

Sulphur and its compounds are raw materials of first importance in the chemical industry. Native sulphur does not occur in Canada, but sulphur dioxide and sulphuric acid are produced in Canada from (1) imported elemental sulphur; (2) by-product pyrites obtained from the concentration of base metal sulphide ores; (3) smelter smoke. Of great interest is the plant proposed by Atlantic Chemical Co. at Hillsborough, New Brunswick, to produce sulphuric acid and portland cement from anhydrite and shale.

Sodium sulphate occurs in solid deposits and in highly concentrated brines in Saskatchewan. From these deposits in 1946 there was produced 105,768 tons of anhydrous salts, valued at $1,030,546, for use mainly in pulp and paper mills, glass plants, and nickel-copper smelters.

Barite, although used in comparatively small quantity in Canada, is quarried in Nova Scotia on a large scale for export. In 1946 the shipments for use in oil-well drilling, lithopone, chemicals, fillers and other purposes amounted to 120,419 tons, valued at $1,006,473.

Calcium carbonate or limestone is of first importance in the chemical industry from the basic standpoint. Its production for all purposes including the manufacture of lime and cement, building stone, agriculture and for chemical and metallurgical industries amounted in 1946 to 11,230,366 tons, valued at approximately $12,000,000. Large quantities are used in the manufacture of lime for electric furnace processing with coke, to produce calcium carbide, the key material of much of the chemical production at Shawinigan Falls, Quebec, and Niagara Falls, Ontario. The manufacture of calcium carbide is of outstanding importance by virtue of its many derivatives.

G. K. Foster

Limestone is also extensively used in the wood-pulp industry, as a metallurgical flux, and as a soil conditioner. Other uses that have expanded rapidly in recent years include the manufacture of rock wool from argillaceous dolomite; magnesia and magnesium from pure dolomite; and high-quality magnesia and hydrated lime from brucitic limestone.

Over 90 percent of the Canadian production of lime is used for chemical and metallurgical purposes. Production in 1946 was 684,674 tons of quicklime, valued at $5,778,243 and 156,125 tons of hydrated lime, valued at $1,296,697. The trend is towards the industrial use of hydrated lime in preference to quicklime.

Phosphate rock of commercial grade is not known to occur in Canada and deposits of apatite are small; hence Canada is dependent on outside sources for its requirements of this important industrial mineral. Imports in 1946 amounted to 373,677 tons, valued at $2,164,-841.

Production of phosphorus and phosphoric acid by electric treatment of phosphate rock has been increasing steadily for production of the high-grade phosphates required in the food industries, etc.

Phosphate rock also contains fluorine which, at Trail, British Columbia, is recovered as hydrofluosilicic acid for use in the preparation of electrolyte for the refining of lead by the Betts process. This by-product recovery has eliminated the utilization of fluorspar for this purpose formerly obtained from the Rock Candy Mine near Grand Forks, British Columbia, which is the largest known reserve of fluorspar in Canada.

Fluorspar is produced only in small quantity in Canada at the present time and most of that used

comes from Newfoundland.

Salt is one of the major pillars of the alkali industry, since it is the raw material for the extensive alkali-chlorine and soda ash industries and is also widely used in other industries. Canada is well supplied with extensive salt deposits in various parts of the country and produces most of her own requirements.

Under the heading of the carbon group Dr. Wright discussed the utilization of natural gas, petroleum, coal, and coke as process materials for the manufacture of an imposing list of chemicals.

Silica sand and quartz, he said, were used in large quantities in the manufacture of glass, sodium silicate, ferrosilicon, silicon carbide, and also extensively as fluxes. An interesting use for diatomite is as a dusting agent for ammonium nitrate fertilizer to prevent the material from caking.

In conclusion Dr. Wright said, "With expanding industrialization we can expect still greater increases in the production of industrial minerals. Further discovery and development of new mineral deposits and greater applications of scientific research to our mineral resources constitute the main highways to the future expansion of our chemical industry on which so much depends in both peace and war."

Asbestos

M. S. Badollet of Johns-Manville Research Center, Manville, New Jersey, in his paper *Research and Development on Asbestos Fibers* gave information on the various laboratory tests that are conducted on asbestos fibers and pointed out the value to the manufacturer of the information thus gained. He said that typical tensile strength values of chrysotile fibers range from 40,000 to 100,000 pounds per square inch—values that are comparable with the tensile strength of the usual grades of reinforcing steel. One of the most difficult jobs to accomplish was the measurement of the true staple length of asbestos fiber, and a method that would quickly measure true fiber lengths would most certainly be welcomed by the industry.

In referring to the future of the asbestos industry Mr. Badollet said that a stage had been reached where considerable expansion in production was necessary. Present demand far exceeds the supply and new developments are coming along very rapidly. Among the most spectacular of these new developments is in the manufacture of asbestos-cement products, such as pipe, shingles, sheets, etc. These products now account for the greatest single use of asbestos and in the near future may require 200,000 tons of fiber. Altogether, states Mr. Badollet, the potential volume of asbestos that could be consumed per year in Canada and the United States might reach 450,000 to 500,000 tons in the near future, provided that the fiber is made available and the asbestos products manufacturers can continue to expand factory facilities uninterrupted by strikes and shortages of material.

Industrial Minerals in the National Economy

In a paper entitled *Industrial Minerals in the National Economy* M. F. Goudge, Bureau of Mines, Ottawa, dealt with the important part played by these minerals in our every-day life. "The key position occupied by industrial minerals in modern Canadian industry was well illustrated two years ago," said Mr. Goudge, "when a strike occurred in the only Canadian plant producing soda ash and calcium chloride at a time when those materials were already in short supply and unavailable from other sources. Within a short time of the shutdown of this plant, in which the two principal raw materials are limestone and salt, the great aluminum reduction plants on the Saguenay river were forced to curtail operations because of the lack of soda ash essential to the process of extracting aluminum from its ores. Automobile production, already harassed by shortages of steel, was further hampered when glass for windshields and windows could not be supplied because the glass industry was slowed down almost to a stop for want of soda ash. Soap became almost unobtainable both to the housewife and to industrial users, because soda ash is required in its manufacture. As a consequence of the soap shortage the production of synthetic rubber at Sarnia was threatened because soap in large quantities is essential to the polymerization process. Motorists on gravelled highways all over eastern Canada drove through clouds of dust because calcium chloride used for dust laying was not to be had. There were other cases of dislocation of industry related to the shutdown of this particular plant, but the above illustrates the wide ramifications of industrial minerals in modern industry."

M. S. Badollet

Since 1898 annual production of industrial minerals has increased 12-fold in value from $10,108,456 to $124,460,346, but dollar value tells only a part of the story. It is only when tonnage figures are considered that the importance of the industrial minerals to our national economy looms up in its true perspective. Unfortunately, tonnage data on the production of some important items in the industrial mineral field are not recorded, but an estimate shows that the tonnage produced in 1947 was in the neighborhood of 72,000,000 tons, a figure that dwarfs the production of metals, whereas on a dollar basis the industrial minerals are overshadowed by the metals, being only about one-third of the value of the latter at present. This great tonnage of low-cost materials enters into every phase of our industrial life, and if these minerals were not cheaply and readily available there would have been little of the great industrial expansion that has come about in Canada within the last generation.

Industrial minerals are of paramount importance in agriculture, where they are utilized in increasingly large quantities as fertilizers, soil conditioners, in stock foods, poultry foods and grit, as food preservatives and as insecticides and fungicides. Fertilizers, chiefly the products of such industrial minerals as nitrates, phosphate rock, potash salts, sulphur, limestone, magnesium minerals and common salt, are today being used in increasingly large quantities because of the now widespread realization of the necessity of adding minerals to the soil to replace those removed by crops and erosion.

Of the principal fertilizer materials Canada is dependent on outside sources for supplies of phosphate,

potash and sulphur, but has prospects of remedying the deficiencies in supplies of the last two. As to nitrates Canada is now a world source.

Recent discoveries of potash salts deep beneath the prairies constitute a new and valuable addition to the country's reserve of essential raw materials and present a challenge to our ingenuity to capitalize on them.

Sulphur, although it does not occur in the native state in Canada, is available from numerous deposits of sulphides and sulphates. Sulphuric acid for fertilizer manufacture is already being recovered from smelter smoke, and plans are being made to produce it from the abundant anhydrite of New Brunswick. Large-scale experiments are now under way at Noranda Mines, Ltd., at Noranda, Quebec, to produce sulphur from huge deposits of pyrite in that area.

Limestone, together with magnesia, is now recognized as an essential plant food as well as a soil conditioner, and its use is fundamental to successful agriculture where soils are deficient in it. In Britain during the last war a special land fertility scheme was evolved under which farmers were obliged to use liming materials. This practice raised the annual consumption of such from 400,000 tons in 1937 to 3,500,000 tons in 1943. In the United States special efforts are being made to encourage the use of agricultural limestone, and an immediate goal of 52,000,000 tons per year has been set. In Canada in 1946 only slightly more than 450,000 tons was used, and that mostly in Quebec and the Maritime Provinces.

In the construction industry the parts played by stone, gypsum, clay, asbestos, sand and gravel, and products such as cement, lime, plaster, brick and insulation materials are so well known that it is unnecessary to emphasize them. Sand and gravel together constitute the largest item in the industrial mineral production. In 1944 nearly 22,000,000 tons was used for concrete aggregate, railroad ballast and general purposes such as foundry sand and engine sand, and for sand blasting and glass manufacture.

Crushed stone also comprises a substantial part of the tonnage of industrial mineral output. In 1946 over 6,000,000 tons was produced, most of which was limestone.

Lightweight aggregate is coming rapidly to the fore as a construction material and its use permits important savings in structural steel and at the same time improves the thermal and acoustical insulation properties of the concrete in which it is used.

M. F. Goudge

The rock wool industry, using limestone, slag and coke as its main raw materials, makes an important contribution to the Canadian economy by making substantial savings in the amount of coal imported into Canada. The Canadian rock wool industry now comprises 12 companies, and the 1947 production had a value of about $5,000,000.

Developments in the use of asbestos-cement products in the construction industry during the past few years have been so rapid that their production now constitutes the principal use for asbestos insofar as tonnage is concerned. Canada produces about 70 percent of the world's supply of asbestos, and exports of this mineral comprise a large item in Canada's foreign trade —$32,969,263 in 1947.

The chemical industry utilizes practically all of the industrial minerals, but a relatively small number suffice to make an amazingly wide variety of products and provide the basis for a widely diversified industry. Such minerals are sulphur, salt, limestone, gypsum, nitrates, silica, potash, sodium sulphate and magnesium minerals. From this small number of industrial minerals, plus coal, oil, and natural gas, most of the more important industrial chemicals can be made. The minerals constitute process materials that completely lose their identity in the reactions in which they are involved and yield products bearing no resemblance to themselves, and thus by the public are rarely associated with the products they make possible.

Lime and limestone fulfill so many different functions in the chemical industry that a lengthy paper could be written on that phase of the subject alone. Formerly considered primarily a building material, lime has, with the growth of the chemical industry, become a very important chemical raw material, and over 90 percent of the Canadian lime production is so used today.

Silica finds important uses in the chemical industry as well as in the electro-metallurgical and ceramic industries. Silicones, acclaimed as one of the most significant chemical developments of the past few years are derived from silica, coke and chlorine.

Clay as a chemical raw material is just coming into its own. The problems of commercial recovery of alumina from clay received a great deal of attention during the war and rich rewards await the individual who can find a cheap way to unlock alumina from its bonds with silica.

Synthesis, or the process of building up compounds from simple compounds or elements, is playing an increasingly important part in the industrial mineral field. Metals cannot be synthesized, but we can synthesize nonmetallic minerals; and synthesis will become increasingly prominent in industrial mineral production in the future. With the development of synthetic minerals we have the power of choice and we can make the mineral to suit specification.

In conclusion, Mr. Goudge said, "At the present time industrial minerals are being used at a rate never dreamed of a decade ago, and deposits that were then considered inexhaustible are now appearing very finite indeed, especially many of those near industrial areas, which are supplying high-grade materials at the low price to which industry has become accustomed. At the same time industry is writing stricter specifications on these raw materials. Where mineral raw materials are coming into short supply from all sources, four courses of action appear open: (1) beneficiation of low-grade materials to bring them up to specifications now in use; (2) developing industrial processes to use the more abundant lower grade materials; (3) use of substitute materials; (4) developing synthetic products from basic raw materials in ample supply. In any case, a great deal of research is required, and as there is always a period of unsettlement involved in any major change of processing, it is imperative that this research be undertaken now while industry is still assured of its normal supplies of raw materials sources."

Kaiser's Radum Plant Adds Scrubbing And Power Equipment

By HARRY F. UTLEY

another ON THE SPOT report

A VISIT to the huge sand-and-gravel plant of the Henry J. Kaiser Co. at Radum, Calif., is always informative because things are never static at Radum. Some new production development or interesting kink is always in the making. When your correspondent stopped off in the early spring of 1948, he found this to be the case as usual. Hard-working, clear-thinking Bart Carter, the superintendent, has been largely responsible for the success of the Radum operation and he has seen its production of salable material mount steadily from about 400 tons to its current 950 tons per hour in the relatively short space of the ten years since he became its superintendent.

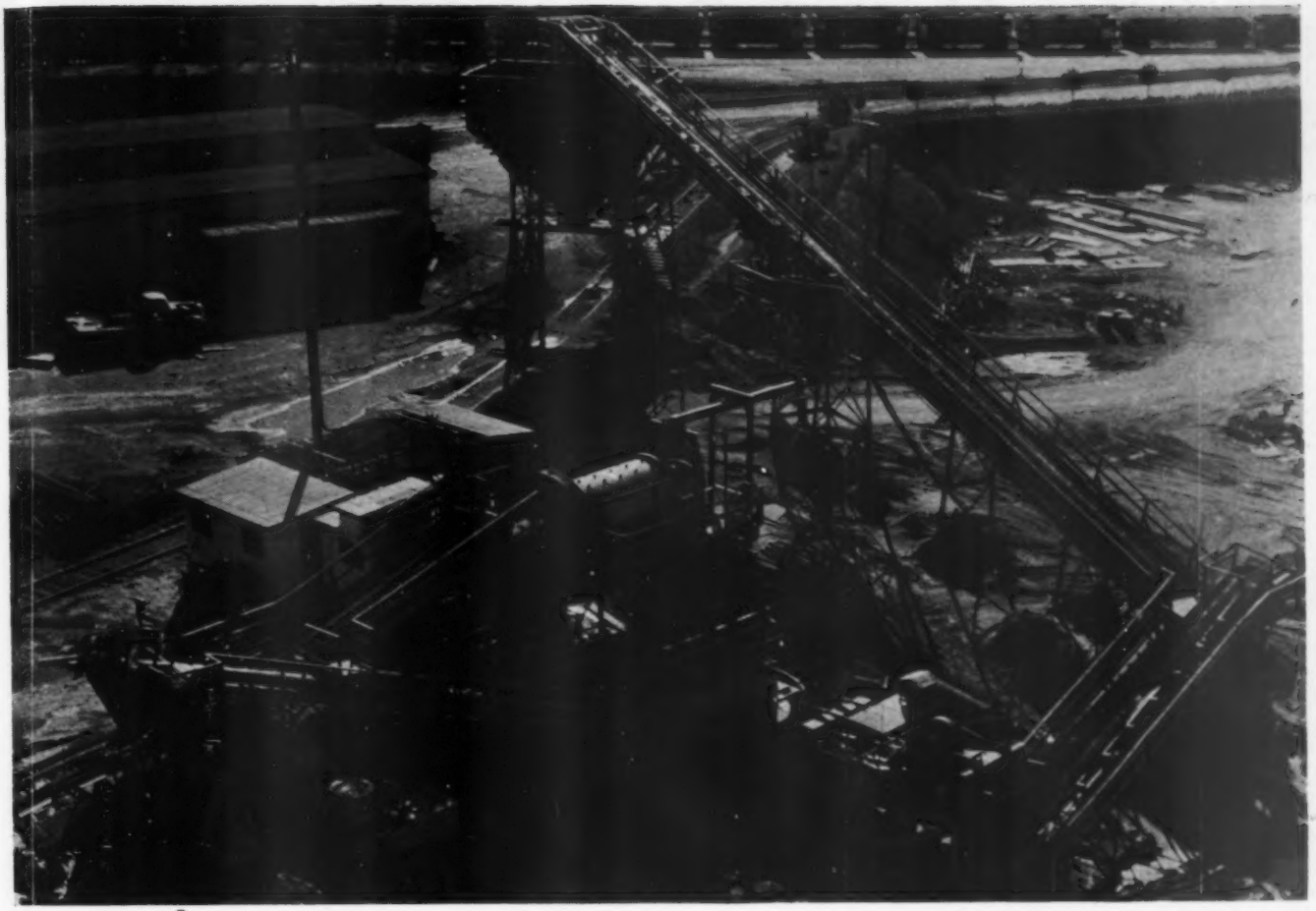
The deposit at Radum contains a high percentage of clay, which has always been an operating "headache". Not only has it required meticulous washing and scrubbing at the plant, but the long conveyor system running from pit to plant has been forced to carry the undesired stuff over thousands of feet of belt right-of-way, along with the high-quality gravel and sand, for removal during normal processing. Too, the oozy nature of the clay (the pit is a wet operation) is inclined to cause troublesome slippage on the belts.

Now Superintendent Carter has devised a primary scrubbing plant for the pit which, he hopes, will eliminate about 75 percent of the clay before the pit-run material starts on its trip to the main plant. The installation is to consist of a pair of 5- by 14-ft. Tyler double-deck screens with 1½-in. wire mesh on the top deck and ⅜-in. on the bottom. The material will be flumed to the screens, aided by an ample supply of water from a 1,00-g.p.m. Byron-Jackson pump. The screens themselves will be fitted with washing sprays and the throughs will be scrubbed and dewatered by a pair of 96-in. Wemco screws. The screen rejects and the product of the screws will go to the plant *via* the conveyors, relatively clean and ready for further and much simplified, processing.

As with other California industrial plants, the drought has forced the state's conservation commission to order a reduction in power consumption at Radum by 20 percent as a water conservation measure. To make up for the deficiency and enable the Kaiser plant to continue operations at normal capacity, Mr. Carter has arranged to install an auxiliary power plant on the premises at Radum. This is to consist of a 1,600-hp. G.M. diesel engine driving a Westinghouse 1,150-kv.a. alternator. The unit will supply current at 2,300 volts on a frequency of 60 cycles to synchronize with that supplied to the plant through the transformers of the Pacific Gas & Electric Co. The power-reduction order is to remain in full force throughout 1948, at least; but with usual Kaiser resourcefulness (H. J. K's motto has always been—"Together we will do it. . . . together we will grow"), Radum will not be forced to shut down operations one day a week as some other plants are doing.

A year or so ago, alarmed by an ever-increasing pile of surplus pea gravel which had reached an estimated 3,000,000 tons and was getting bigger every day, Superintendnt

• An aerial view of the Kaiser operations at Radum, Calif. The new primary scrubber installation will be located at the pit, seen at the extreme top of this picture.



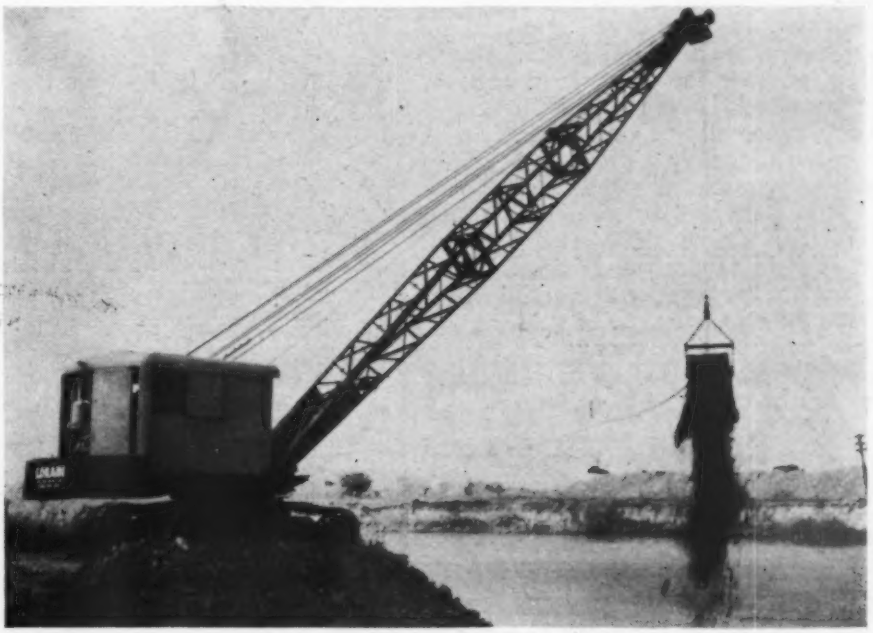
• The Radum sand-grinding plant, which reduces pea gravel to specification concrete sand at a 50-ton-per-hour rate.

Carter installed a grinding plant to reduce this ⅜-in.-minus material to sand. Earlier, the Radum pits had been running about 40 percent fines, but natural sand content had dropped to 30 percent . . . . and the pea-gravel pile seemed to offer the solution to the sand shortage.

A cone crusher was first installed but it was soon replaced by an 8- by 12-ft. Marcy rod-mill which has worked perfectly. An 8- by 75-ft. corrugated-metal tunnel was driven into the bottom of the pea-gravel pile, gates feeding a 24-in. by 80-ft. reclaiming belt operating in the tunnel and feeding the rod mill, where a closely-controlled amount of water is introduced. The pulp discharges to a 4- by 10-ft. Robins screen carrying .203 woven-wire mesh, oversize being returned to the mill. Screen throughs pass to a 15-ft. Dorr hydroseparator and rake classifiers. About 15 percent of the total volume of material is sluiced away in the form of slimes at this point, the clean sand being carried up by belt conveyor to a 250-ton steel car-loading bin. The product of the grinding plant is a clean, sharp concrete sand which fully meets state specifications. Because it is sharp and somewhat coarse, it is also in big demand for asphalt-plant mixes.

According to Mr. Carter, production of rod-mill sand runs slightly better than 50 t.p.h. with the set-up described. Connected horsepower totals 559. Rod consumption has run almost exactly 1 lb. per ton of sand produced.

On its record in the sand-grinding plant, Mr. Carter plans shortly to incorporate another Marcy rod-mill in the flow sheet of the plant proper to increase the fine-sand fraction. This will be a 5½- by 10-ft. unit which is already on order.



• The Texas Construction and Material Company, Houston, Tex., uses a Lorain-80 as a dragline to strip overburden along the shores of the lake from which gravel is dredged and piped out. The firm owns two other Lorains.

Efficient Use of Compressed Air from Portable Compressors in Quarries*

PART III

Drill Steel Sharpeners—The problem of making and maintaining a supply of properly sharpened drill steel, drill shanks and detachable bit thread upsets, at a minimum cost, resolves itself into one of organization and the selection of the proper machine and equipment to do this work (Fig. 8). Drill steel sharpeners operated on compressed air at 80 to 100 pounds pressure have been used successfully for many years. There are several sizes of drill steel sharpeners available, depending entirely upon the quantity and class of work that must be done.

Modern practice has continually demanded more powerful rock drills. Power and still more power has been the demand and this requirement has been met through a combination of engineering and metallurgical research. Parallel with improvements in rock drills has been the development of better drill steel, particularly in respect to fatigue failure. However, no major improvement occurred in the rock-cutting portion of the steel until the advent of the detachable bit. Since the introduction of the detachable bit, its acceptance by both mining and contracting has grown tremendously.

Line Oilers—The important function of the line oiler (Fig. 9) is the elimination, as far as possible, of the human element in providing continuous lubrication of pneumatic devices, particularly rock drills. The use of the line oiler is strongly recommended. No rock drill, paving breaker, or other air tool should be used continuously without one. The most common and popular size for this purpose holds about one pint of oil. This size should take care of a hand-held machine if filled twice a day. For the larger stopers and drifters, the operator must be guided by the rate of oil consumption. Perhaps a filling once in two hours would be nearer the required specification.

These devices consist essentially of a reservoir for the oil, with suitable filler and adjustment arrangements, a central channel through which the compressed air flows enroute to the drill, and means whereby the lubricants picked up and delivered into the air stream in the form of atomized oil or vapor. Some oilers utilize a wick for drawing oil toward the point of delivery into the air; others have various systems of tubes. All are designed to empty the oil chamber in whatever position the oiler may be placed while functioning.

Recommended Specifications for Rock Drill Lubricant

Consistency	Shall be of such a consistency as to adhere readily to metallic surfaces under the conditions which exist in a rock drill.
Flash, Cleveland open cup	380° F. Min. (a)
Carbon Residue	0.30% Max.
Viscosity for atmospheric temperatures below 20° F.	SAE 10
Viscosity for atmospheric temperatures 20° to 40° F.	SAE 20
Viscosity for atmospheric temperatures 40° to 80° F.	SAE 30
Viscosity for atmospheric temperatures 80° to 110° F.	SAE 40
Viscosity for atmospheric temperatures above 110° F.	SAE 50
Mineral Acidity	None
Free Fatty Acid (as oleic %)	0.40 Max.
ASTM Steam Emulsion Number	600 Max. (b)
Metallic Soaps	None
Pour Point, °F.	+10 Max. (c)
Film Strength, lbs. per sq. in.	Almen Test—12,000 (d) Weeks Test— 8,000 (d)

(a) For extremely low temperature operation, where a lower than normal viscosity is necessary, minimum flash point may be reduced to 350° F.
(b) 1200+ desired for applications where moisture is a major factor. In this case foaming must be recognized by the operator when filling the lubricator.
(c) For below normal atmospheric temperature operation, lower pour test product may be required.
(d) Values indicated are desired rather than minimum. Rock drill oils must give definite indication of load carrying ability appreciably above that obtained for a like viscosity straight mineral oil. High film strength is especially desirable under drilling conditions involving heavy rotational load.

Standard Steel Sections

During the development of the rock drill, many different sections of steel have been used. For the original piston-type drill, solid steel was used and an octagon shape was the common section. Cruciform steel was also used in dry stopers, but modern practice has practically eliminated all sections of steel, with the exceptions of the following:

Hollow hexagon steel, ⅞-inch and 1-inch diameter from flat to flat, is used in hand-held sinkers, stopers and some light drifters.

Hollow quarter-octagon steel, ⅞-inch and 1-inch diameter from flat to flat, is also used in hand-held sinkers, wet stopers and light drifters.

Three sizes of hollow round steel, 1-inch, 1⅛-inch and 1¼-inch are used primarily in all drifter drills, although the round sections with

Fig. 8. A typical field installation of a lightweight bench-type sharpener.

*The material in this article was compiled from "Compressed Air Handbook," recently published by the Compressed Air and Gas Institute, 90 West St., New York 6, N. Y.

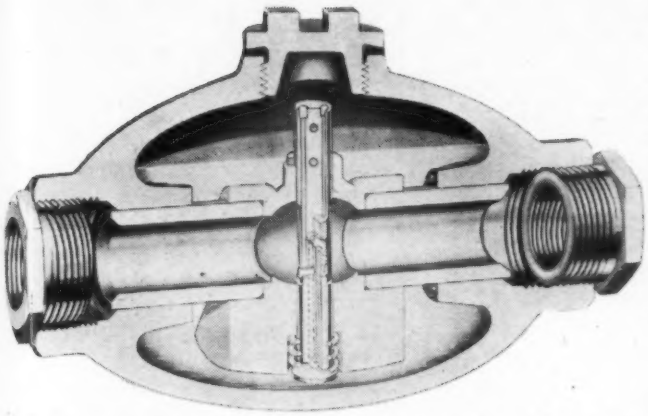


Fig. 9. A sectional view through a form of line oiler in which capillary attraction is employed to convey the lubricant from the oil reservoir to the point of delivery into the air stream.

lugged shanks also are used in sinking drills and stopers to a limited degree.

In paving breakers, solid hexagon steel is used, of three different sizes, 1-inch, 1⅛-inch and 1¼-inch diameter from flat to flat.

Drill Testing—The standard method used for obtaining air consumption of rock drills is by means of the water displacement air meter. A typical water displacement air meter installation (Figs. 10, 11 and 12) and a description of its operation is given in the following paragraphs.

Water Displacement Air Meters—Many air meters have been developed for special purposes. One of these is the water displacement air meter which is of interest by reason of its ingenious construction. This may be used where a relatively small volume under working pressure has to be determined with a relatively high degree of accuracy in order to evaluate the performance of a pneumatic tool or an air drill.

A section through this meter is shown in Fig. 11. The three diagrams, shown in Fig. 12 explain its functioning.

The reducing valve L is set for the desired pressure. The machine whose capacity is to be measured is connected to the outlet line. The valves are now set as shown at upper left of Fig. 12. The valve E in the line D being closed, the water is held stationary in each tank. With the valves in this position, air from the inlet line will pass through the tanks directly to the outlet line and through the machine connected thereto.

To measure the volume of air passing through the machine, the throttle valve on the machine is first closed. As soon as the pressure in the tanks becomes equal, as indicated by the gauges P and Q, the valves are changed to the position shown at upper right of Fig. 12. The tank A is now in communication with the inlet line but cut off from the outlet line. The tank B is opened to communication with the outlet line but closed to the inlet line. The level of the water in the gauge-glass S is noted, and the valve E is opened. The valves are now in position shown in Fig. 11 and the meter is ready to measure the volume of air passing through the machine.

When the throttle on the machine is opened, the air in the tank B passes through the outlet line to the machine. This causes the water to flow to tank B. At the end of the interval during which it is desired to measure the volume of air used, the valve E is quickly closed. The drop of level in the gauge-glass S is now measured and from this the volume of air used is calculated, the volume of the tanks A and B having been previously determined.

To reverse the conditions, the valves in the inlet and outlet lines have been thrown to the position shown at bottom of Fig. 12. The meter is now ready for further measurements and when the valve E is opened the water will flow from the tank B to the tank A, readings being taken on gauge-glass V. In actual practice the valves on the meter can be manipulated with such rapidity that it is not necessary to stop the working of the machine to be tested, and any number of readings can be taken while the machine is in constant operation.

When using the meter, readings are taken by using a graduated board, which is placed behind the water-gauge glasses, one graduation being used for each pressure.

When the term "air pressure" is used in connection with the operation of a drill, the pressure at the drill while running is meant. Rock drills are designed for the most efficient operation at air pressures between 80 and 90 pounds at the drill while the drill is running. Care should be taken to see that the air piping and hose used with the drill are of sufficient size so that the air pressure at the drill itself will not be reduced by friction below an efficient operating pressure.

Low Air Pressure

Low air pressure is an abuse of the compressed air system, a costly and wasteful practice which should not be tolerated. Ignorance of the effects of low air pressure contributes more than any other single factor to a lack of appreciation of the effectiveness of compressed air power.

By "low air pressure" is meant inadequate pressure at the tool or device which is air-operated. It is at this point that the air is used as power. Only the pressure and volume of air available at the point of use can be effective in doing work.

The Causes of Low Air Pressure—The causes of low air pressure are easily classified: (1.) insufficient compressor capacity, (2.) inadequate piping and (3.) leakage.

When it is discovered that pressure is too low, the first inclination is to install more compressor capacity. This is not necessarily the correct answer. It should first be determined whether the compressors are at full load when the air pressure is low. If they are, then more compressor capacity may be required but even then consideration must first be given to two other common causes of low air pressure.

The second cause is inadequate piping. A measure of the adequacy of piping is the pressure loss between the air receiver, where the compressor endeavors to maintain constant pressure, and the point of use. This should not exceed 10 percent in a well-designed system. The absolute maximum drop for the worst point in the system should not exceed 15 percent. If the pressure drop is greater than 10 percent average with 15 percent maximum throughout the entire distribution system (including hose), then attention should be given to correction of this fault before considering increased compressor capacity.

A third cause of low air pressure is leakage or loss of air without doing work. It has been pointed out that permitting excessive leakage is the same as exhausting the output of a compressor directly to atmosphere.

Obviously, if leakage is eliminated, the compressed air formerly wasted will be available for useful work. The expense of making lines tight will undoubtedly be less than the installed cost of a new compressor, while the daily power saving may be considerable.

Elimination of leakage is certainly a sensible step toward maintaining air pressure and conserving power.

The Effects of Low Air Pressure—There are very few uses of com-

pressed air not vitally influenced by low air pressure. All portable rock drills, concrete breakers, hoists, scrapers, loaders, sandblasts, air lift pumps, etc., operate less effectively when the proper air pressure is not maintained.

The positive results of increasing air pressure to the proper value are: (1.) increased production and (2.) reduced cost per unit produced. Since the two are interdependent, they will be discussed without attempting to differentiate.

Considering rock drills as a distinct class of air-powered tools, it has been found that increasing air pressure at the drill from 70-pound gauge to 90-pound gauge results in about 41 percent increase in drilling speed. This is an average of eight different types and makes of drills.

This increase in drilling speed was not accompanied by corresponding increase in the cost of operation. Air consumption of the drills increased only 32 percent, while the labor cost did not increase at all, thus greatly decreasing the total cost per unit of work done.

The Remedies of Low Air Pressure—The remedies for low air pressure are just as definite as the causes and effects. Faulty air power conditions are usually due to poor planning or to increased air uses without corresponding system expansion. Analysis should determine the full extent of low air pressure and the present air flow requirements. Future growth must also be considered.

Pressure loss varies roughly as the square of the velocity of air flowing through the line. For example, a 3-inch line, 1000 feet long, will handle 500 cubic feet per minute with a 2.5-pound pressure loss, while a 4-inch line will pass about 1000 cubic feet per minute with the same drop. The *installed* cost of the 4-inch line will, however, be very little more than that of the 3-inch line, since most of the cost is labor.

Methods of increasing line capacity to decrease pressure loss and improve conditions at the point of use vary with different installations. One may call for a line paralleling the original, with frequent interconnections; another may require the installation of a loop system with some outlets taken off the new line to relieve the old; still another may need a complete new system.

Not the least of the problems of correct system layout is the selection of the proper hose for final transmission of compressed air to the tool. Losses of 15 percent to 25 percent in air pressure are frequent in the hose alone. *Don't* use a hose longer than is necessary to make the tool available to the work and to give proper freedom of movement to the operator.

Every cubic foot of leakage eliminated is pure gain. Such losses in many systems will reach 10 percent to 20 percent of the total air compressed. An air leakage test should be run on the complete plant and every section of hose should be inspected. Although leaks are usually small, they may be numerous, having a high total effect. A single 1/16-inch hole will waste 182,000 cubic feet per month, costing $9.10.

The most likely locations of small leaks is around valve stems, in hose connections, unions, drains, homemade blow guns, and lines leading to inoperative tools. Elimination of leakage involves making the system tight, then *keeping it tight*. Regular inspection is mandatory.

Only after it has been determined that the distribution system is adequate and that leakage has been eliminated, should increase in compressor capacity be considered.

Compressed Air Costs with Oil Engine Drive—The oil cost per 100 cubic feet of free air is read directly from Table 1.

Example: If it requires 22 brake horsepower to deliver 100 cubic feet of free air at 90 pounds pressure and the fuel oil costs 6 cents per gallon, the fuel oil cost per 100 cubic feet of free air is 0.138 cents.

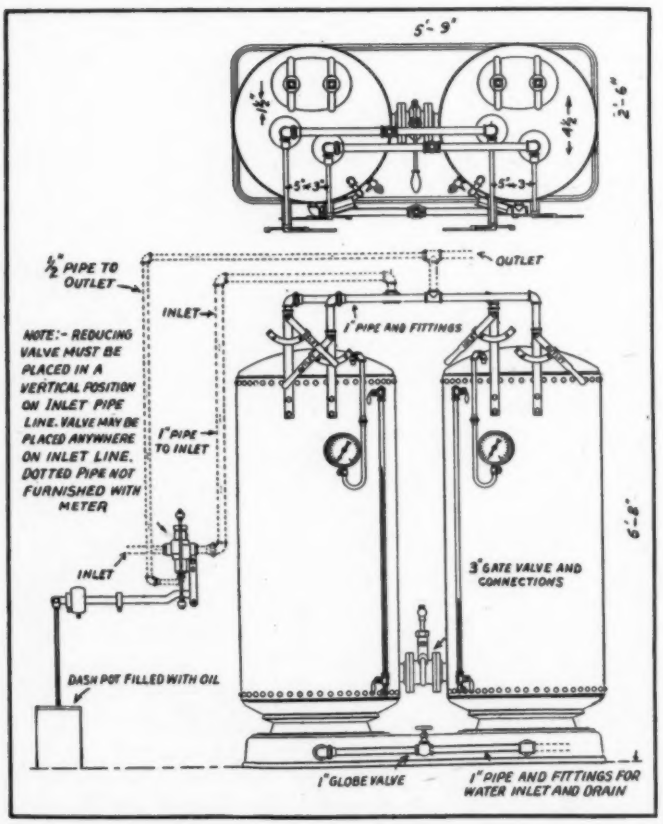

5'-9"
2'-6"
4½"
5"x3"
½" PIPE TO OUTLET
OUTLET
INLET
1" PIPE AND FITTINGS
NOTE:- REDUCING VALVE MUST BE PLACED IN A VERTICAL POSITION ON INLET PIPE LINE. VALVE MAY BE PLACED ANYWHERE ON INLET LINE. DOTTED PIPE NOT FURNISHED WITH METER
1" PIPE TO INLET
6'-8"
INLET
3" GATE VALVE AND CONNECTIONS
DASH POT FILLED WITH OIL
1" GLOBE VALVE
1" PIPE AND FITTINGS FOR WATER INLET AND DRAIN

Fig. 10. Water displacement meter. When using the meter, readings are taken by using a graduated board, which is placed behind the water-gauge glasses, one graduation being used for each pressure.

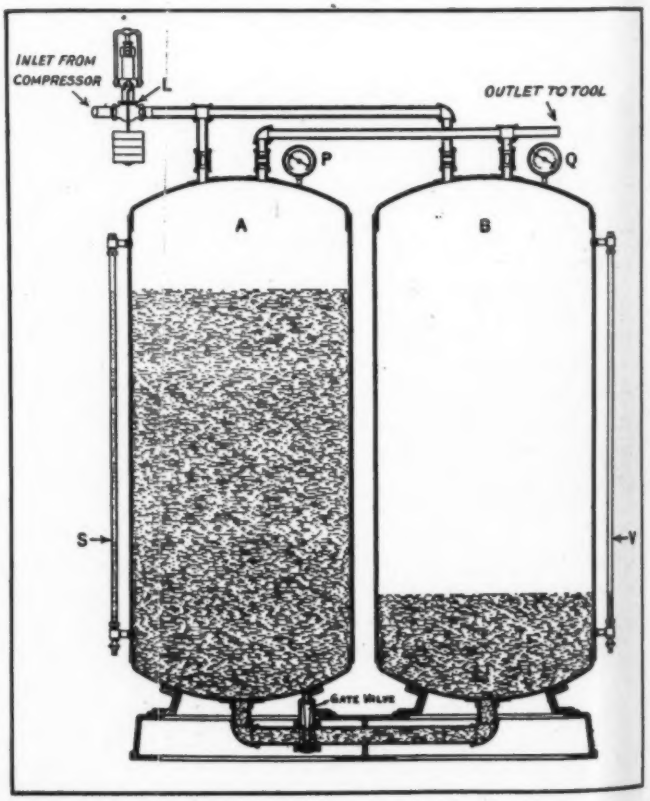


Fig. 11. A sectional view of a water displacement meter.

Table 1

Cost of Fuel Oil in Cents to Compress 100 Cu. Ft. of Free Air

Oil Consumption One-Half Pint (About .45 Lb.) Per Brake Horsepower Hour

Brake Hp. to Deliver 100 Cu. Ft. of Free Air Per Minute	Price of Fuel Oil, Cents per Gallon Value of 18,500 Btu. per Lb. Based on Fuel Oil with Effective Heat							
	3	4	5	6	7	8	9	10
16	.050	.067	.083	.100	.117	.133	.150	.167
18	.056	.075	.094	.113	.131	.150	.169	.189
20	.063	.083	.104	.125	.146	.167	.188	.210
22	.069	.092	.115	.138	.160	.183	.206	.230
24	.075	.100	.125	.150	.175	.200	.225	.251
26	.081	.109	.136	.163	.190	.217	.244	.272
28	.088	.117	.146	.175	.204	.233	.262	.293
30	.094	.125	.156	.188	.219	.250	.281	.314

Table 2

Cost of Gasoline in Cents to Compress and Deliver 100 Cu. Ft. of Free Air

Gasoline Consumption One Pint (About .75 Lb.) Per Brake Horsepower Hour

Brake Hp. to Deliver 100 Cu. Ft. Free Air per Minute	Price of Gasoline, Cents per Gallon							
	8	9	10	11	12	13	14	15
16	.267	.300	.333	.367	.400	.433	.467	.500
18	.300	.338	.375	.413	.450	.488	.525	.563
20	.333	.375	.416	.458	.500	.542	.584	.626
22	.367	.413	.458	.504	.550	.596	.642	.688
24	.400	.450	.500	.550	.600	.650	.700	.750
26	.433	.488	.542	.596	.650	.705	.759	.813
28	.467	.525	.584	.642	.700	.759	.816	.875
30	.500	.563	.626	.688	.750	.813	.875	.938

Table 3

Cost of Gas in Cents to Compress and Deliver 100 Cu. Ft. of Free Air

Based on Fuel Consumption of 10,000 Btu. Per bhp. Hour

Brake Hp. to Deliver 100 Cu. Ft. of Free Air per Minute	Gas Rate Based on 1000 Btu. Gas Cost of Gas in Cents per Thousand Cu. Ft.							
	10	15	20	25	30	35	40	45
16	.026	.039	.052	.065	.078	.091	.104	.117
18	.029	.044	.059	.073	.088	.102	.117	.132
20	.033	.049	.065	.081	.098	.114	.130	.146
22	.036	.054	.072	.090	.107	.125	.143	.161
24	.039	.058	.078	.097	.117	.136	.156	.176
26	.042	.063	.085	.106	.127	.148	.169	.190
28	.045	.068	.091	.114	.137	.159	.182	.205
30	.049	.073	.098	.122	.146	.170	.195	.220

Fig. 12. Different positions of the valves of the water displacement meter. M—inlet pipe; N—discharge pipe; G and H—valves in inlet pipe; J and K—valves in discharge pipe; D—outlet between tanks; E—valve in outlet D.

Compressed Air Costs with Gasoline Engine Drive—Table 2 is based on a gasoline consumption of one pint per brake horsepower-hour. This consumption will not vary greatly, but where there is a variation, the figures given in Table 2 should be changed in proportion to the variation. The cost is read directly from this table. If the cost of gasoline is 16 cents per gallon, multiply the figures in the 8 cents column by 2.

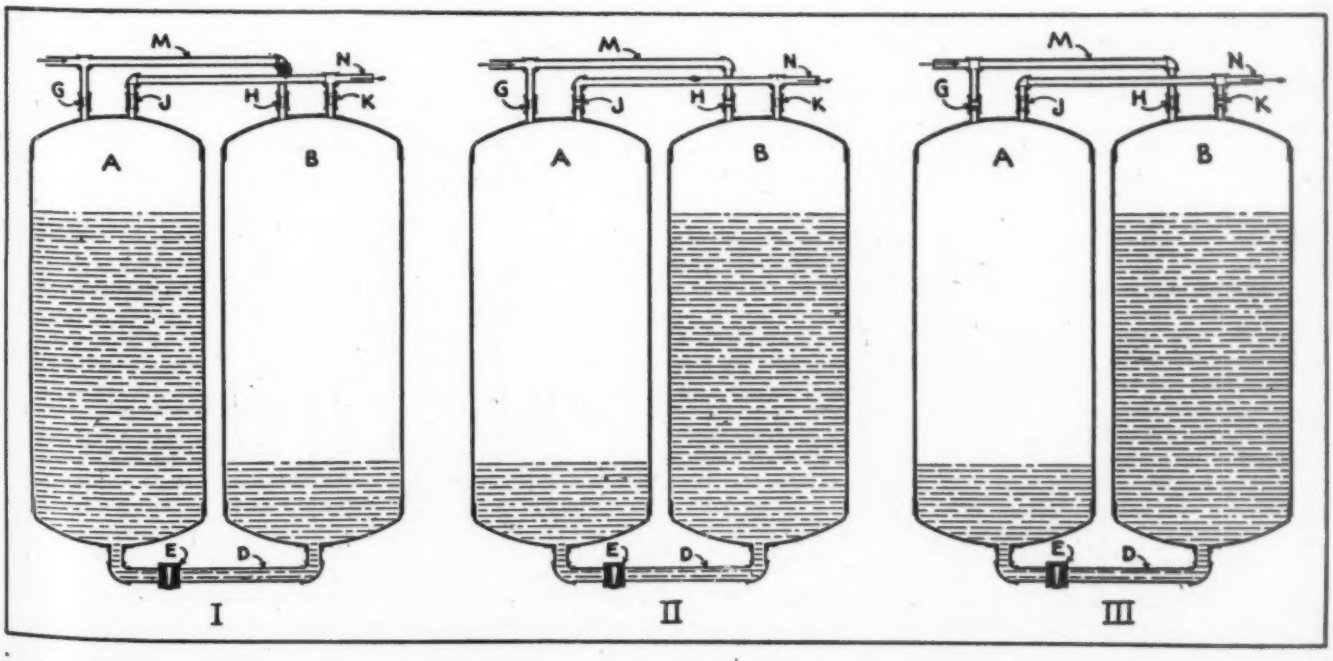
Example: If it requires 22 brake horsepower to deliver 100 cubic feet of free air at 90 pounds pressure and gasoline is 16 cents per gallon, the gasoline cost per 100 cubic feet of free air will be .367 x 2 = .734 cents.

Compressed Air Costs with Gas Engine Drive—Table 3 is based on gas having a heating value of 1,000 B.t.u. per cubic foot. If the gas has a different heat content, change figures in the table proportionately.

Example: If it requires 22 brake horsepower to deliver 100 cubic feet of free air at 90 pounds pressure and gas costs 20 cents per thousand cubic feet, it will cost .072 cents. If the B.t.u. content of the gas were 700, the gas cost would be $.072 \times \frac{1000}{700} =$ .1029 cents.

Table 4

Size of Opening Inches	Cu. Ft. of Air wasted per month at 100 lbs. pressure, based on nozzle coefficient of .65	Cost of Air wasted per month based on 6 cts. per 1,000 cu. ft.
3/8	6,671,890	$400.31
1/4	2,920,840	175.25
1/8	740,210	44.41
1/16	182,272	10.94
1/32	35,508	2.73



Cost of Air Leaks—Leaks in the valves and joints of a compressed air system waste a considerable amount of air. A number of leaks that seem small in themselves may total a tremendous volume of wasted air. Table 4 shows the dollar and cents value of this wastage.

Often it is possible to determine the exact extent of the air losses in a plant by finding what portion of the compressor capacity is required to keep pressure in the air lines when no equipment is being operated.

Careful maintenance of air lines will more than pay for itself and may in some cases make unnecessary the replacement of the present compressor with one of larger capacity.

Sales and Earnings Climb for Three Nationally Known Firms

Medusa Cement Company, Calaveras Cement Company and American Potash and Chemical Corporation officials all reported increased sales and profits for 1947.

Net sales for Medusa totaled $11,418,712, the highest in the company's history, according to J. B. John, president. This figure topped last year's sales by $1,265,465. Calaveras reported net sales for 1947 amounting to $2,962,700, as compared with $1,873,899 in 1946. Net profit reported on December 31, 1947 was $236,573, as compared with $79,679 for 1946.

Statistics released by American Potash and Chemical Corporation officials indicated an increase of 39 percent in earnings over the 1946 total and the setting of sales and production records. Net income was $2,106,319, as compared with $1,514,105 last year. Sales jumped from $10,738,368 in 1946 to $13,647,700 last year, as production rose from 541,327 tons of material to 594,764 tons.

Multipliers to Determine Air Consumption of Rock Drills at Altitudes and for Various Number of Drills

Altitude in Feet	Number of Drills																
	1	2	3	4	5	6	7	8	9	10	12	15	20	30	40	50	70
	Multiplier																
0	1.	1.8	2.7	3.4	4.1	4.8	5.4	6.0	6.5	7.1	8.1	9.5	11.7	15.8	21.4	25.5	33.2
1,000	1.	1.9	2.8	3.5	4.2	4.9	5.6	6.2	6.7	7.3	8.3	9.8	12.1	16.3	22.0	26.3	34.2
2,000	1.1	1.9	2.9	3.6	4.4	5.1	5.8	6.4	7.0	7.6	8.7	10.2	12.5	16.9	22.9	27.3	35.5
3,000	1.1	2.0	3.0	3.7	4.5	5.3	5.9	6.6	7.2	7.8	8.9	10.5	12.9	17.4	23.5	28.1	36.5
4,000	1.1	2.1	3.1	3.9	4.7	5.5	6.1	6.8	7.4	8.1	9.2	10.8	13.3	18.0	24.4	29.1	37.8
5,000	1.2	2.1	3.2	4.0	4.8	5.6	6.3	7.0	7.6	8.3	9.5	11.1	13.7	18.5	25.0	29.8	38.8
6,000	1.2	2.2	3.2	4.1	4.9	5.8	6.5	7.2	7.8	8.5	9.7	11.4	14.0	19.0	25.7	30.6	39.8
7,000	1.2	2.2	3.3	4.2	5.0	5.9	6.6	7.4	8.0	8.7	10.0	11.7	14.4	19.4	26.3	31.4	40.8
8,000	1.3	2.3	3.4	4.3	5.2	6.1	6.8	7.6	8.2	9.0	10.2	12.0	14.7	19.9	27.0	32.1	41.8
9,000	1.3	2.3	3.5	4.4	5.3	6.2	7.0	7.7	8.4	9.2	10.5	12.3	15.1	20.4	27.6	32.9	42.8
10,000	1.3	2.4	3.6	4.5	5.4	6.3	7.1	7.9	8.6	9.4	10.7	12.5	15.4	20.9	28.3	33.7	43.8
12,000	1.4	2.5	3.7	4.7	5.6	6.6	7.4	8.2	8.9	9.7	11.1	13.0	16.0	21.6	29.3	34.9	45.5
15,000	1.4	2.6	3.9	4.9	5.9	6.9	7.7	8.6	9.3	10.2	12.6	13.6	16.7	22.6	30.6	36.5	47.5

Air consumption at altitudes will vary with construction of drill.
Air consumption for various number of drills based on fact that all drills will not operate at once. It will vary with rock, type of work, etc.

Friction of Air in Hose
Pulsating Flow

Size of Hose, Coupled at Each End, Inches	Gage Pressure at Line, Lbs.	Cubic Feet Free Air Per Minute Passing Through 50 Foot Lengths of Hose													
		20	30	40	50	60	70	80	90	100	110	120	130	140	150
		Loss of Pressure (Lbs. Per Sq. In.) in 50 Ft. Lengths of Hose													
½	50	1.8	5.0	10.1	18.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	60	1.3	4.0	8.4	14.8	23.4	.....	.....	.....	.....	.....	.....	.....	.....	.....
	70	1.0	3.4	7.0	12.4	20.0	28.4	.....	.....	.....	.....	.....	.....	.....	.....
	80	.9	2.8	6.0	10.8	17.4	25.2	34.6	.....	.....	.....	.....	.....	.....	.....
	90	.8	2.4	5.4	9.5	14.8	22.0	30.5	41.0	.....	.....	.....	.....	.....	.....
	100	.7	2.3	4.8	8.4	13.3	19.3	27.2	36.6	.....	.....	.....	.....	.....	.....
	110	.6	2.0	4.3	7.6	12.0	17.6	24.6	33.3	44.5	.....	.....	.....	.....	.....
¾	50	.4	.8	1.5	2.4	3.5	4.4	6.5	8.5	11.4	14.2	.....	.....	.....	.....
	60	.3	.6	1.2	1.9	2.8	3.8	5.2	6.8	8.6	11.2	.....	.....	.....	.....
	70	.2	.5	.9	1.5	2.3	3.2	4.2	5.5	7.0	8.8	11.0	.....	.....	.....
	80	.2	.5	.8	1.3	1.9	2.8	3.6	4.7	5.8	7.2	8.8	10.6	.....	.....
	90	.2	.4	.7	1.1	1.6	2.3	3.1	4.0	5.0	6.2	7.5	9.0	.....	.....
	100	.2	.4	.6	1.0	1.4	2.0	2.7	3.5	4.4	5.4	6.6	7.9	9.4	11.1
	110	.1	.3	.5	.9	1.3	1.8	2.4	3.1	3.9	4.9	5.9	7.1	8.4	9.9
1	50	.1	.2	.3	.5	.8	1.1	1.5	2.0	2.6	3.5	4.8	7.0	.....	.....
	60	.1	.2	.3	.4	.6	.8	1.2	1.5	2.0	2.6	3.3	4.2	5.5	7.2
	70	.....	.1	.2	.4	.5	.7	1.0	1.3	1.6	2.0	2.5	3.1	3.8	4.7
	80	.....	.1	.2	.3	.5	.7	.8	1.1	1.4	1.7	2.0	2.4	2.7	3.5
	90	.....	.1	.2	.3	.4	.6	.7	.9	1.2	1.4	1.7	2.0	2.4	2.8
	100	.....	.1	.2	.2	.4	.5	.6	.8	1.0	1.2	1.5	1.8	2.1	2.4
	110	.....	.1	.2	.2	.3	.4	.6	.7	.9	1.1	1.3	1.5	1.8	2.1
1¼	50	.....	.....	.1	.2	.2	.3	.4	.5	.7	1.1	.....	.....	.....	.....
	60	.....	.....	.....	.1	.2	.3	.3	.5	.6	.8	1.0	1.2	1.5	.....
	70	.....	.....	.....	.1	.2	.2	.3	.4	.4	.5	.7	.8	1.0	1.3
	80	.....	.....	.....	.....	.1	.2	.2	.3	.4	.5	.6	.7	.8	1.0
	90	.....	.....	.....	.....	.1	.2	.2	.3	.3	.4	.5	.6	.7	.8
	100	.....	.....	.....	.....	.....	.1	.2	.2	.3	.4	.4	.5	.6	.7
	110	.....	.....	.....	.....	.....	.1	.2	.2	.3	.3	.4	.5	.5	.6
1½	50	.....	.....	.....	.....	.....	.1	.2	.2	.2	.3	.3	.4	.5	.6
	60	.....	.....	.....	.....	.....	.....	.1	.2	.2	.2	.3	.3	.4	.5
	70	.....	.....	.....	.....	.....	.....	.....	.1	.2	.2	.2	.3	.3	.4
	80	.....	.....	.....	.....	.....	.....	.....	.....	.1	.2	.2	.2	.3	.4
	90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.1	.2	.2	.2	.3
	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.1	.2	.2	.2
	110	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.1	.2	.2	.2

For longer or shorter lengths of hose the friction loss is proportional to the length, i.e., for 25 ft., ½ of the above; for 150 ft., 3 times the above, etc.

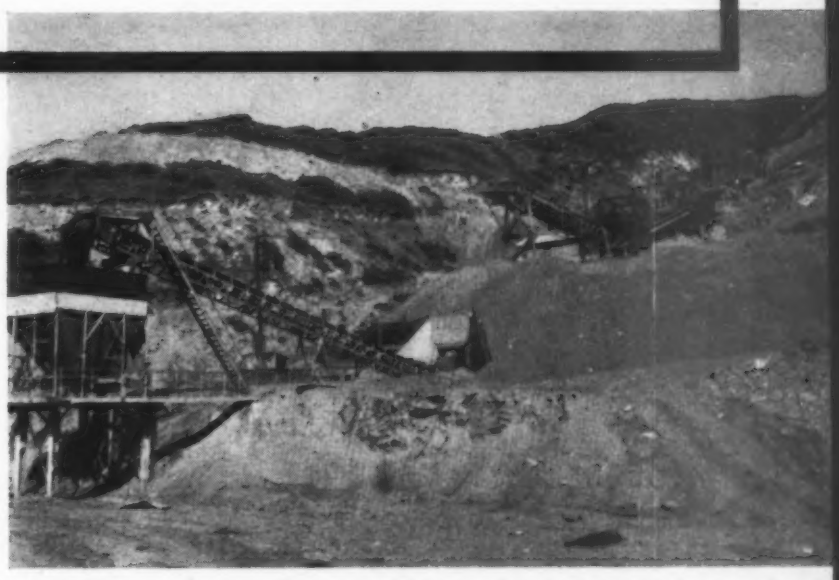
• Left: A perspective view of the Livingston Truck and Materials Company's plant at Palos Verdes, Calif., looking from the feed end to the loading point. Seen in the distance is the Pacific Ocean.

• Right: At the quarry—a 2½-cu. yd. powered by a diesel engine loads broken material into one of the company's 15-ton trucks.

new stone plant overlooks Pacific Ocean

By HARRY F. UTLEY

650,000 tons of crusher-run product to be used in Long Beach harbor



• Another view of the plant, taken from the truck loading level. Note the conveyor emerging from the tunnel beneath the surge pile (center of picture).

another ON THE SPOT report

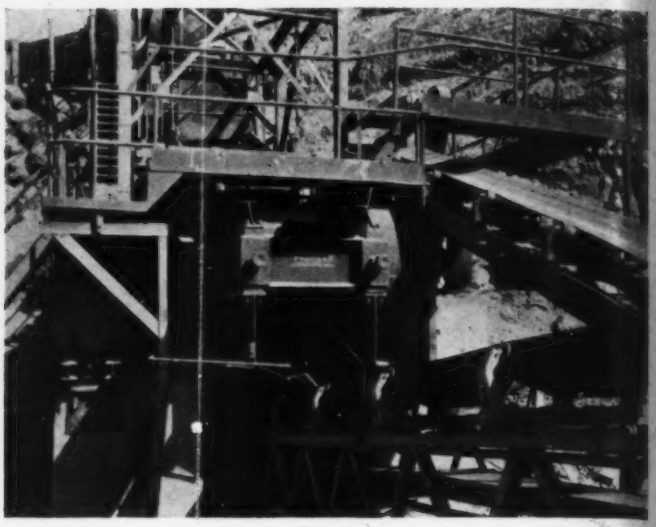
THE road builders have taken a lesson from the designers of heavy-duty airport runways by insisting that pavements be ballasted with a thick layer of closely-knit crushed rock sub-bases to cushion the slab against the impact of heavy vehicles and to provide adequate drainage. Crusher-run base courses are becoming a part of specifications generally for all heavily-traveled thoroughfares. This trend is especially pronounced in California where, with a tremendous backlog of superhighway construction under way, there is an enormous demand for this type of material.

The new Palos Verdes plant of the Livingston Truck & Materials Co. was designed and built specifically to produce crusher-run material in high volume at low cost. A similar type of rock is also needed in quantity for a broad program of harbor improvement at Long Beach; in fact, an initial contract for a minimum of 650,000 tons of 3-in.-minus material as underwater piling protection on Piers B and C, now under construction by the Long Beach Harbor Department, will alone keep the Livingston plant busy for months to come.

Since 1942 the company has had a lease on some 250 acres of granitic stone in the Palos Verdes Hills overlooking the Pacific Ocean, and on this deposit a pilot plant had been operated in recent years, both as a commercial venture and to determine the type of equipment best suited to turn out crusher-run base material efficiently and economically. A high percentage of the stone is necessarily crushed. By trial and error the present plant was evolved under the watchful eyes of Carder Livingston, president and general manager, and his plant superintendent, Roy Blower. The new facilities are entirely of steel and concrete, and much of the equipment—bins, conveyor structures and the like—were fabricated at the Livingston shops in Long Beach.

The stone is of variable hardness, some running 17 percent on the Los Angeles Rattler test; the average is

• The 30- by 42-in. primary jaw crusher below the 50-ton receiving hopper.



• A closeup of the 54- by 24-in. roll crusher and the return belt (right) which feeds the 40- by 22-in. rolls (not shown).

about 30 percent. Capacity of the plant is about 300 tons per hour of 1-in.-minus rock, with production actually exceeding 400 t.p.h. for "mound rock."

Several quarries are being opened up; in the main quarry a 150-ft. face is being worked. Two Gardner-Denver wagon drills prepare the deep holes and five or six of these are loaded with 20 percent black powder every two or three weeks and detonated, such a blast bringing down upwards of 30,000 tons of well-fragmented stone. It is planned to abandon working such a high face, however, in favor of benching at about 35-ft. levels in the near future. Gardner-Denver 365-c.f.m. and Sullivan 310-c.f.m. compressors furnish the air for the drills.

Broken material is loaded in trucks by a new Link-Belt Speeder 2½-cu. yd. shovel, powered by a Caterpillar D-17000 diesel engine. The haul from the main quarry to the plant is nearly 1,000 ft. and slightly down grade, the rock being transported by three White 15-ton-capacity end-dump trucks. Loads are discharged into a 50-ton steel hopper at the head of the plant which is arranged for straight-line, down-hill production. A 36-in. by 12-ft. Link Belt apron feeder, electric-motor-driven and push-button-controlled, feeds the rock from the hopper to a sloping-bar grizzly with 4-in. openings, oversize sliding to a Pioneer 30- by 42-in. jaw crusher set at 4 in. and driven by a 100-hp. motor. By-passed and crushed material is carried on a 30-in. by 50-ft. belt conveyor to a 4- by 12-ft. Pioneer scalping screen with 2-in. square openings. Plus 2-in. stone goes to a Pioneer 54- by 24-in. double-roll crusher set at 1½ in.

The product of the roll crusher and the minus 2-in. scalping screen throughs are combined and carried by a 30-in. by 60-ft. belt conveyor to a Pioneer 4- by 12-ft. double-deck screen. The top deck of this screen has 1½-in. cloth to relieve the load on the 1-in. lower-deck mesh. Rock retained on both decks is carried back by a 24-in. by 80-ft. belt conveyor to a Pioneer 40- by 22-in. roll crusher, driven by a 50-hp. motor and set at approximately ½ in., which feeds its product back to the 30-in. by 60-ft. conveyor, thus closing the circuit.

Finished 1-in.-minus stone passing the bottom deck of the double-deck screen is carried to a surge pile by a 30-in. by 100-ft. belt conveyor. The pile has approximately 15,000 tons' live-storage capacity and the material is reclaimed by a 30-in. by 150-ft. tunnel belt conveyor, fed

(*Continued on page* 103)

• Right: The 4- by 12-ft. double deck screen. Plus 1-in. rejects from both decks go to the roll crusher in closed circuit.

• Below: Half of the new Livingston fleet of 20 six-wheel trucks line up in dress parade.

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Air Heating and Waste Heat Recovery Applications of Fluidization

By WOLF G. BAUER
Consulting Engineer

In unfolding the subject of fluidization in a series of articles*, the writer attempted to resist the temptation of going directly into some of the process unit details and application possibilities before exploring some of the fundamentals of the fluidization principles. We can now discuss in a little more detail some simple applications in the light of what has been learned with pilot and small commercial-size test units during the past.

In developing the writer's particular fluid bed techniques for heating or cooling gases and solids, two basic designs were established, the "downflow" and the open channel "cross-flow" methods. Since most of the work and results at this time are concerned with the latter, this open channel cross-flow system will now be analysed in more detail. (Note: this method will henceforth be known as the Bauer "Turboflo" process, the various units such as dryers, kilns, furnaces, heat-exchangers, etc., being prefixed by the term "Turboflo".)

Basic Design Factors In setting up the requirements for a noncatalytic fluid bed heat process unit, low gas pressure, maximum unit capacity, efficient gas and solid heat recovery, and positive stage-processing control were deemed vital for applications to industries processing minerals and materials at relatively small profit margins.

After considerable laboratory experimentation at elevated temperatures, it soon became apparent that a bed of fluidized particles with its high and thorough mixing rate and heat-equalizing tendency would not only prove difficult to treat and control continuously in well-defined stages, but heat recovery would not be efficient due to the variable gas exposure time of the mixing particles in each bed. It was then found that a bed of fluidized particles, receiving progressive heat treatment from gases, should be baffled and made to flow with a positive slow or fast current in a single lateral direction in order to bring about a uniform residence time during the continuous process cycle. This was accomplished by building the bed area in the form of a long and narrow channel containing submerged flow-impeding baffles. These baffles not only extend above and below the fluid bed surface, but are aligned with gas-flow partition walls below each grate or bed support, thereby maintaining the control section continuity in all the superimposed chambers or stages. (See the first published photograph of a fluidized bed in open-channel flow, PIT & QUARRY, June, 1947, page 73. This sectionalizing of gas flow or reaction control can be seen in the aforementioned reference.)

The efficient thermal heat recovery requirement was met not only by superimposing several channels one over the other, but also by positioning the sections in each stage such, that the hottest gases leaving one section will pass through the coolest solid phase section above it, or vice versa. (See Figure 1.)

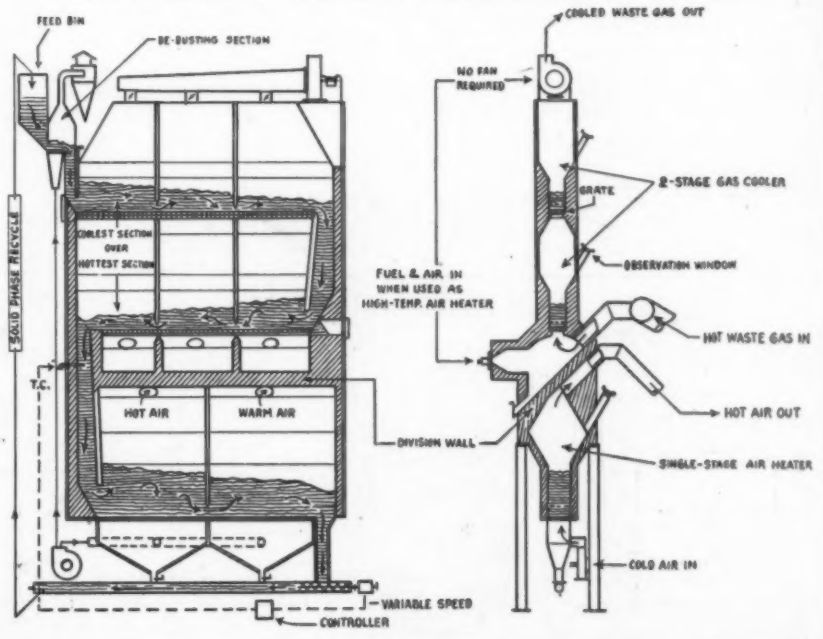
The bed supports, grates, or grids, are composed of refractory slotted tile made of high-alumina material in order to withstand high temperature gases in the process of initial combustion. The side walls of each channel are vertical for the depth of the bed, flaring out wide above the fluid bed free surface in order to reduce gas velocities, and so inhibit fines entrainment.

Air Heating Air is one of our most abundant and chemically uniform substances employed in numerous industrial applications. Alone or in combination with other gases, it represents the most widespread heating or heat-carrying medium at our disposal. (10 to 50 tons and more of air are used for every ton of fuel used in processing.) The technique of applying or subtracting heat to or from air is, therefore, a major process phase.

Hot air may be used to convey heat from one process stage to another, to increase flame temperatures or combustion efficiencies, to absorb large quantities of water as in drying, to activate, oxidize, vaporize, condition, or to heat materials to high temperatures under special atmospheric conditions.

Air is heated either by burning fuel (indirectly by steam), by electricity in some instances, or by waste gases from high-temperature opera-

FIG. 1. SCHEMATIC DETAIL OF TURBOFLO RECUPERATOR AND ADAPTION TO AIR-HEATER



*See Pit and Quarry, May, 1947, p. 90; June, 1947, p. 70; Aug., 1947, p. 83; Nov., 1947, p. 89.

tions of furnaces, kilns, cupolas, boilers, etc. In the case of waste heat recuperation or regeneration, present techniques consist of passing hot waste or combustion gases through alloy metal tubes or refractory ducts, while cold air is made to flow in parallel or counter flow on the other side of the heat-absorbing wall surfaces. In regenerators, the process is cyclic, and heat-absorbing refractory checkers are alternately heated and cooled by waste gases and air. Continuous type recuperators or air heaters are limited by the refractoriness of expensive alloys, and by the gas-tightness of refractory shape construction.

As shown in previous articles, fluidized solids of small-particle diameter present heat-abstraction surfaces of a hundred to a thousandfold that of ordinary present-day recuperators and regenerators. In the Bauer Turboflo recuperator and air-heater, the actual working volume within the unit may present from 1000 to 20,000 square feet of gas scrubbing surface per cubic foot of gas passage, this area depending on the particle size and range of the solid phase fluidized. Present practice allows for less than 100 square feet.

Characteristics of Solid Phase Good indications have been obtained on short test runs with fused alumina in sand size between 20-30 mesh, such as the alundum grain manufactured by Norton Co. Such natural refractory sand as olivine also proved satisfactory, although thermal shock must be watched for in the natural minerals which often have a tendency to crack and decrepitate on very sudden heating. Requirements for such a recycled heat exchange grain are:

1. High specific heat in order to absorb the maximum quantity of B.T.U.s in a given chamber volume.
2. Narrow particle-size range of the grains in order to allow maximum flexibility in gas velocity changes as required, and without entraining the smallest particles.
3. High refractoriness to prevent fusion with contacting surfaces, or possible agglomeration.
4. High thermal shock resistance to withstand the sudden gas heating and cold air quenching in continued alternate cycles.
5. Good abrasion resistance in order to minimize dusting and attrition losses from rubbing and colliding action of the particles in the fluidized state.
6. High density, which allows the use of higher gas velocities or through-put in relation to surface and particle size. In some cases, high density also reflects low absorption with certain impure gases.
7. Chemical inertness to certain corrosive gases.

No doubt future experience may dictate also certain particle shape requirements. Spherical particles, for example, may be less prone to attrition and wear.

Cross-Flow vs. Counter-Flow The Turboflo recuperators and air-heaters are and will be designed to fit varying and wide conditions of air and heat requirements. Some processes, such as melting tanks and cupolas, require a stream of very high temperature air (+ 1500 deg F.), while in others, a large quantity of medium-hot air (500-1500 deg. F.) for drying operations, gypsum or hard plaster calcining, mineral salt dehydrating, etc., may be needed. At times, separate streams of low- and high-temperature air may best fill local needs. The open channeled cross-flow technique seems to be well adapted to these requirements by virtue of the independent control and sectioning of the channel stages.

Actually, this cross-flow may be called a modified counter-flow, at least in respect to the unit as a whole, since the air or gases are ascending through several successively hotter or cooler stages or levels of material. Within each stage or level, however, exchange of heat the flow channel to the other, the rate or amount of such exchange being a function of the temperature difference between gas and solid phase. This is, of course, one of the reasons why the channels are partitioned in the manner shown in Fig. 1. By sectioning the various stages thus, the following advantages are gained:

a. Gases of different compositions or temperatures may be drawn off separately from the unit.
b. By preventing the temperature to equalize in each channel from end to end, these partitions and baffles allow the positioning of the fluidized beds in such a manner as to place the coolest material into the path of the hottest gases.
c. Since the success of stage-processing and control in this particular technique depends on this forward stream flow of the material, a high rate of flow causes such a surface gradient to develop (large bed depth differential between each end of a channel) that gases have a tendency to short-circuit toward the shallow bed end (down-stream end) where resistance to gas flow is least. The continuous partition and baffle arrangement prevents such shortcircuiting tendency, yet allows considerable forward stream velocity. For long channel units, special gas locks have been developed for even more positive flow sectioning.

The reader can readily see that the term "cross-flow" refers to the relative directions of the vertical-flow stream of gas, and the horizontal-

FIG. 2. DIAGRAMMATIC RECUPERATOR HOOK-UP

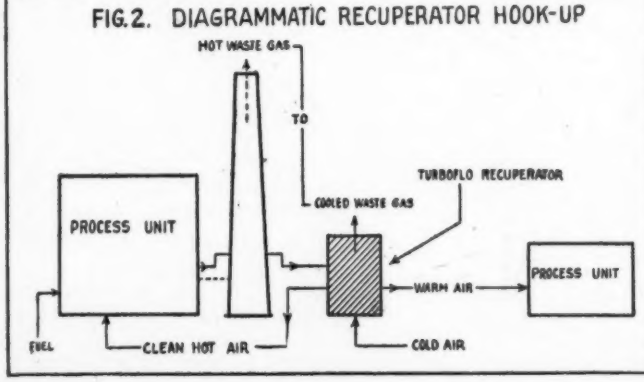
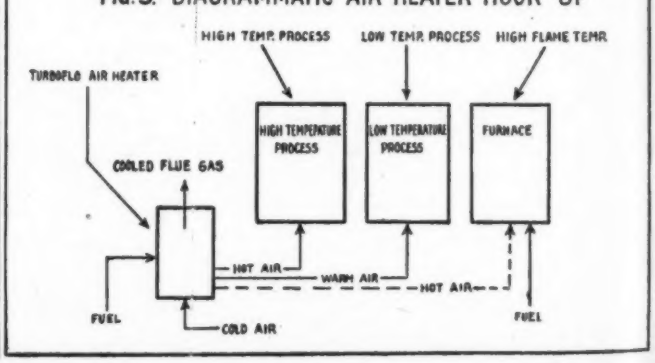


FIG. 3. DIAGRAMMATIC AIR-HEATER HOOK-UP



flow stream of the solid phase, which are therefore at right angles to each other.

Turboflo Recuperator The field of the recuperator, like that of the waste-heat boiler, lies chiefly in those processing operations in which flue or waste gases of relatively high temperatures become available. At lower temperatures, power costs rapidly outbalance heat savings.

The open channel cross-flow technique is well adapted to heating air with waste heat, as gas pressures can be held to a minimum. In this application, suction is applied to the gas-cooling upper section of the turboflo unit by a high-temperature fan. The solid phase is made up of finer-mesh particles in a narrow range of sizing (for minimum bed depth and power demands), and the stream flow velocity is made maximum. When waste gases are dusty, a cyclone is interposed between the exhaust fan and the recuperator exhaust.

It can be seen that the unit is divided into an upper waste-gas-cooling section (2-stage in the illustration), and a lower air-heating section by the division wall. The upper stages serve to heat the solid phase, which then heats the cold air in the lower air-heating section. Each stage or chamber is connected to the other by a connecting duct, acting as a gas seal between each stage. The fluidized stream of solids becomes static or compact as it enters these ducts, and flows down the duct as in any ordinary chute or bin. The ducts are well insulated. In the recuperator or air-heating units, these ducts are of minimum cross-section for high rate of down flow, while in the turboflo are processing units, the connecting ducts may be of large volume to provide heat soaking and stabilizing time between heating and cooling stages. It was found that temperature and output control could best be regulated from thermocouples placed in these connecting ducts, and where the measuring units were least influenced by gas temperature.

The Turboflo Air-Heater This unit is designed in a way very similar to the turboflo ore processing furnaces and calciners. (The reader should always keep in mind the fact that these discussions are based on only two testing units of pilot plant and laboratory size, and that these units have and are being continuously altered to test their application to many processes.) The chief difference in the air heater and waste-heat recuperator lies in the inclusion of an integral combustion chamber in the case of the former. This combustion chamber designed for the pilot plant unit has operated satisactorily on manufactured gas and oil, and is located in direct line of heat application within the device. In this position it may also be adapted to producer gas and pulverized coal firing.

Combustion is allowed to be only partially completed in the combustion chamber, final mixing and burning of air and fuel gases taking place during the gas passage through the grate slots or openings and within the space of the fluidized bed.

Pressure-tight observation windows of Pyrex glass have made it possible to observe the condition of the red hot fluid bed surface as it flows and boils along the channel. Bed sections which are not self-illuminating can be observed through such windows by focusing spot-lights through the tubes onto the material.

Depending on economic considerations, this air heater may be heated with fuel and cold combustion air, or some heated air from the air-heating section may be applied to the fuel. Unlike the waste-heat recuperator, the air heater does not require an exhaust fan with cold gas or oil fuel. With producer gas, a fan may be used to lower the combustion chamber pressure to values somewhere near or not far above atmospheric. Pulverized coal can be burned under pressure.

The rate of heat release with oil has been found to be quite high under the conditions of pressure and high air preheat. Since combustion need not at all be complete in the so-called combustion chamber, this initial burning zone can be held to minimum space requirements. For pulverized coal, additional space must be provided to achieve the necessary time factor for coke particle consummation.

The solid phase through-put or recycling rate is regulated automatically by amplification of the thermocouple EMF through the discharge feeder controler. In this device, the flow action of the solid phase over the several grates and down through the connecting ducts may be likened to a viscous fluid. When the surface of the fluid is lowered at the discharge end of the last channel, an incremental lowering wave moves back to the bin discharge opening, causing more fluid to flow into the first channel to neutralize the unbalanced fluid head condition.

Capacity Factors Operation of the turboflo air heater above or below normal capacity is a function of the particle size range of the solid phase employed, and considerable flexibility is possible with a narrowly-graded grain size. This point was brought out in detail in a plotted graph in an earlier article, showing the range of fluidizing and lifting free space velocities with various size particles. Since combustion air also serves as fluidizing air in certain processing stages, the heat or fuel input becomes a function of the air quantities that can be used in a given area of channel.

The heat abstraction efficiency is closely related to the channel current speed or forward travel rate of the stream of solid phase. The greater this flow speed (solid phase through-put), the more complete the heat transfer between gas and solids. With the design shown in its simplest form in Fig. 1, the forward stream velocity can be variety considerably without in any way affecting the required gas velocity through the unit. Within certain limits, the rate of gas-handling capacity of the unit is simply a function of the grate or channel width, with only minor changes in chanel length or unit height. Thus, if a 3-in. wide by 10-ft. channel handles ten tons of solid phase, a 6-in. channel will take care of 20 tons, and a 30-in. channel 100 tons.

Construction Basically, turboflo units of the channel design are built of rectangular and internally-reinforced steel shells lined with insulating refractories, and an inner lining of hrad fire bricks of a composition to suite conditions in the various zones. The fluid bed supporting grates are highly-refractory perforated tile, or alloy screens for lower temperature conditions. Several designs of slots and holes have been tested, the shape, size, and spacing depending on such factors as dust, particle size, temperature, allowable pressure loss, etc. Grate plates are loosely laid into the channel bottom, and can be removed for inspection or replacement from the outside.

Operating combustion chambers at relatively new high pressures and temperatures presented a number of new problems. In the construction of the many openings into the unit, the fitting of brick and steel shell for a gas-tight whole, required new

(*Continued on page* 100)

Portland Host to Northwest Institute of Mining and Metallurgical Engineers

another ON THE SPOT report

THE Northwest Institute of Mining and Metallurgical Engineers held its Northwest Industrial Minerals Conference at Portland, on May 8 at the Hotel Multnomah, Portland, Ore. The first session was opened by Fay I. Bristol, chairman, and an address of welcome by Eric Allen Jr., secretary to Gov. John H. Hall.

The first speaker was Dr. Vernon E. Scheid, head, Department of Geology, University of Idaho, Moscow, Idaho, who discussed rock wool and its importance in the insulation, fireproofing and industrial fields. He pointed out the various types of rock wool, the sources of supply of raw materials and the number of plants manufacturing this commodity in the Northwest. Of the five existing plants, two manufacture black and three white rock wool. The color is determined by the type of raw material used. Some of the materials used following recent discoveries are slag, lava, bottles and debris from refractory plants.

The second speaker, R. F. Griffith, Portland representative for the Washington Brick and Lime Co., Spokane, Wash., read the paper on *The Manufacture and Marketing of Sand-Lime Brick* for Everette R. Hannah, operations manager, who was originally scheduled to speak but due to a fire at the plant, could not be spared to attend the conference.

Next on the program was Fred D. Gustafson, resident mining engineer, Dantore Products Division, Dant & Russell, Inc., Maupin, Ore. Mr. Gustafson followed the general outline of his paper, *Dantore—Its Origin, Development and Use,* but digressed occasionally to emphasize the more important phases of production and the uses of perlite.

The next speaker was Stephen H. Green, mining engineer, Washington State Division of Mines and Geology, Olympia, Wash. Mr. Green's talk covered the discovery of Steilacoom gravel, its purity, strength, freedom from stain or coating and the almost unlimited supply. A lively discussion took place regarding comparative merits of local sand and gravel to Steilacoom gravel.

Following lunch, with Leslie C. Richards as toastmaster, a talk was given by Henry Mulryan, Western vice-chairman, Industrial Minerals Div., A.I.M.E. The subject scheduled was *The Growth of the Mineral Industry of the West and Its Importance to Our Future.* He spoke of the growth of the talc industry from its use as a dentifrice and a cosmetic to covering for pills, gloss in shirts, sheen for paper and many other uses not commonly known to the layman. He said that only 3 percent of talc goes into dentifrices and cosmetics as against 97 percent for other commercial uses, and that its use is steadily growing.

The first speaker at the afternoon session was James A. Barr Jr., Applied Research Laboratories, Armour & Co., Chicago, Ill. Due to illness he was unable to prepare papers for presentation and his talk on *Industrial Mineral Flotation* was delivered from hand notes accompanied by moving pictures and slides. It was a highly technical and well-thought-out presentation which aroused considerable discussion.

Industrial Minerals Research was the subject covered by Richard J. Anderson, Battelle Memorial Institute, Columbus, O.

Ray Miller, president, Miller Products Co., Portland, Ore., discussed *Agricultural Diluents,* following his paper almost verbatim.

The final discussion of the afternoon session was by Dr. Hal J. Kelly, metallurgical engineer, Northwest Experiment Station, U. S. Bureau of Mines, Seattle, Wash. Mr. Kelly cut his talk short, touching upon the high spots in his paper, accompanied by slides showing the locations on illustrated maps of the known deposits of refractory clay in Washington, Oregon and Idaho.

Dinner was served at 6:30 p.m. at the Hotel Mallory, followed by a talk on *New Developments in Power and Fuel and their Effect on the Industrial Growth of the Pacific Northwest,* by John Deerdorff, vice-president, Pacific Power & Light Co.

This was the first such conference ever held in the Northwest by the A.I.M.E.

Gouverneur Talc Company Completing Mill at Balmat, N. Y.

At Balmat, N. Y., the work in installing heavy machinery and other equipment has been launched by the Gouverneur Talc Company at its mill on the Balmat-Fowler highway. Vats have been erected in three of the silos.

The shaft at the mine is reported to have reached a depth of 340 feet.

• Viewing nonmetallic mineral samples are A. O. Bartell, managing engineer, Raw Materials Survey; Lester Richards, A.I.M.E., arrangements committee; F. W. Libbey, director, Oregon Dept. of Geology & Mineral Industries; C. K. Sterrett, manager, Industries Department, Portland Chamber of Commerce.

• Participants in the conference program: L. C. Richards; F. W. Libbey; Gen. T. M. Robins, Raw Materials Survey and member of industries committee, Portland Chamber of Commerce; Henry Mulryan, Western vice-chairman, Industrial Minerals Division, A.I.M.E., and vice-president-general manager, Sierra Talc & Clay Co.

Crushed Stone Takes to the Air*

APPRECIABLY increased production figures for the Glenford, Ohio, quarry of The Central Silica Company came as a result of two significant additions to the concern's mechanical facilities—an electrically-powered aerial tramway and a Marion 93-M shovel.

Construction of the 7800-ft. tramway got under way more than a year ago and was completed late in August, 1947. The 93-M was put into operation in the company's expansive quarries in the same month and has averaged 2000 tons of sandrock in every 8-hour work day.

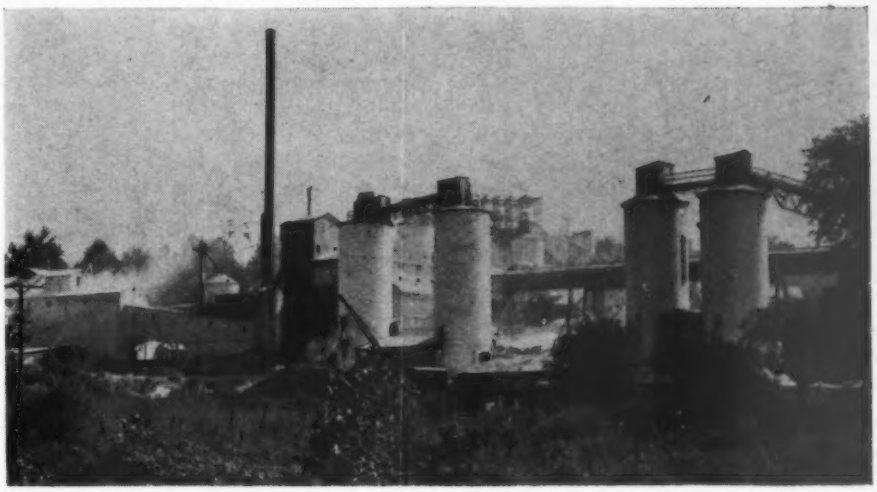
According to preliminary engineering estimates, the new aerial tramway at the Glenford quarry will increase the capacity to transport rock to the processing plant from 10 tons per hour to about 250 tons hourly.

The new tramway reduces the round trip distance between quarry and plant from six to less than three miles. One of the tramway's 72 buckets, each with a capacity of 3200 lbs. of rock, can make the round trip in about 30 minutes. The trip by truck requires approximately 45 minutes.

Late last August, company officials said that only three trucks would be needed at the quarry when the tramway swings into full running gear. The function of these trucks under the new arrangement is to transport rock from the digging site to the quarry's primary crusher. Under the old system, before the tramway was completed, eleven trucks were required to haul the rock from the quarry to the processing plant. The tramway now accomplishes this operation.

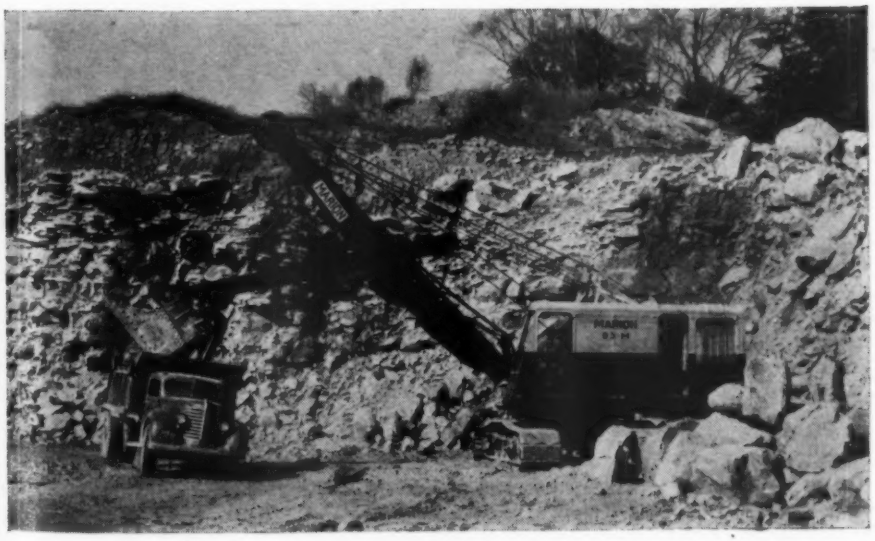
Under the new tramway system, the rock first goes through the primary crusher. From there it is carried on a conveyor belt to a silo located at the quarry terminal of the tramway. The rock is then transferred to a vibrator which loads it into the carrier buckets. This loading operation can be accomplished in only 15 seconds.

The loading at the quarry and the dumping at the processing plant, about a mile and a half away, are both achieved through automatic electrical controls. With such an ingenious set-up, a crew of only four men is required to keep the tramway in operation. The head



• The processing plant of the Central Silica Company at Glenford, O.

• The structure at the left houses the primary crusher at the quarry. At the right is the quarry terminal of the company's new aerial tramway system.



• An action shot of Central Silica's new shovel digging into the 40-ft. face of the quarry.

*Based on an article which appeared in the *Marion Groundhog* for December, 1947, published by The Marion Power Shovel Company.

man is the tramway operator. His chief assistant is a maintenance man. The other two are not concerned with the actual tramway operation but are considered as part of the crew. One operates the primary crusher at the quarry and the other watches the secondary crusher at the processing plant.

The conveying cables of the tramway are supported by 16 carefully-placed towers, the highest of which measures 103 ft.

In addition to the new shovel and the aerial tramway, an important improvement at the Glenford quarry is a new-style primary crusher. The drag for this crusher was designed by Robert McAllister, production engineer of the Central Silica Co. This drag is said to be one of the largest of its kind in the country.

Another addition in the company's large-scale mechanical expansion program is a drop ball which eliminates the need for secondary shooting.

The rock secured from the quarry is very high in silica content. According to Mr. Ridenour, superintendent, approximately 75 percent of the material passing through the plant is subjected to a thorough sulphuric acid and flotation treatment. The processes used in this refinement of the product are covered by patents and were originated and developed at this plant. The company has been operating since 1905.

The headquarters of the Central Silica Co. are located in Zanesville, Ohio. J. A. Crew of the same city serves as vice-president and is in charge of all operations. Robert W. McAllister is general superintendent, Harvey Ridenour of Glenford is superintendent of the plant and Lloyd Mack of Glenford is quarry foreman.

Air Heating

(*From page* 97)

techniques of interlocking construction, shell stiffening, and care in refactory placement. The rectangular steel shell is reinforced by webbing on the inside within the brickwork, serving the dual purpose of stiffening and gas-baffling between steel and brick.

In the commercial-size test unit, Houck oil burners supply fuel oil at 7-lb. pressure to the combustion chamber, the latter being under 2½ lb. A Spencer 2-stage turbine blower supplies atomizing air at 4-lb. manifold pressure, some fluidizing air for heating being first made to flow through a plenum chamber around the burner nozzles for cooling purposes. For low temperature air requirements, mixing with cold additional air outside of the air-heater is more economical than passing all heating air through the heater. Air temperatures between 1000 to 1500 deg. F. have been tested and there is no reason why 2000 deg. F. air cannot be obtained with this system. A "de-dusting" section at the feed channel is shown in Fig. 1, but which was not made a part of the test unit design. Such a de-dusting section would remove the finer sizes ahead of the heating zone, and also take care of dust resulting from slow attrition of the recycled solid phase.

Temperature tests and calculations indicate that anywhere from 40 to 65 percent of the heat in gases can be extracted, the useful heat efficiency depending in all cases on the required temperature of the heated air, the temperature of the waste gases, and the stream velocity of the solid phase and number of stages. In the case of the air heater in which the solid phase is heated by fuel in an integral combustion chamber, thermal efficiencies are higher, and may reach 75 percent. In all cases, overall efficiencies are modified by relative fuel and power costs, i.e., additional channel stages or deeper stream beds extract more heat at the expense of higher working pressures to move the gases and air. An economic balance must be set up to determine the point and the design where fuel savings and power expenditures are most favorable.

Applications The economics of air heating for combustion or process uses are closely associated with the temperature and quantity of waste heat, of the heated air required, and of fuel and power costs when the air is heated with generated heat from combustion. Uses of air heaters may be classified under two divisions—(1) combustion and (2) process heating.

Combustion—The obtainment of high temperature air for combustion uses opens up new possibilities for burning low B.t.u. fuels such as coke, wood, lignite, wastes, or wet fuels at flame temperatures on a par with the richer fuels. In applying highly-heated air to coal, oil, and gas, it has already been shown that flame and melting temperatures above the service level of common refractories can readily be obtained. This widens the field of common fuels to where it may overlap into that of the electric arc furnace and coke blast cupolas. (A furnace temperature rise of about 70 percent of the air pre-heat may be realized.)

This matter of high flame temperature is not only of interest to metallurgical operations, sintering, etc., but also to mineral or slag wool manufacturers. Not only may the cheaper local fuel become applicable with this extra heat boosting property of preheated air, along with higher fuel efficiency, (1 percent saving for every 35 deg. F. preheat) but the elimination of costly fluxes, or heretofore unsuitable glass compositions and ingredients of refractory nature that can be molten at higher temperatures, may result in low alkali wool of higher chemical and heat-resisting quality.

Heating—Clean hot air may be used in the following ways: for heating buildings or drying chambers; for the drying of materials at high or low temperatures in rotary, pallet, tunnel, or spray dryers; for calcining or dehydrating mineral salts or hydrates without fuel contamination; for furnishing hot air to other turboflo units under high pressure, or to combination drying and grinding mills; for superheating to red heat various gases such as steam, hydrogen, natural gas, etc.; for special reduction processes; and for making possible the eventual use of very high temperature air for direct firing of alloy, enamel, ceramic kilns without fuel in clear oxidizing atmospheres, and without resorting to inefficient muffling of such heat for purposes of preventing gas contamination.

Reliance Whiting Co. Plant Damaged in $50,000 Blaze

Extensive damage to the Reliance Whiting Company's plant at Alton, Ill., was caused on May 4 by a fire which swept the firm's facilities after an electrical storm. It is thought that a short circuit caused by the storm started the fire.

A rock crusher and buildings were damaged and a large amount of finished whiting was destroyed. The amount of the loss was estimated at about $50,000, according to Charles E. Hermann, president of the company.

Carolina Giant Cement Co. To Open Plant on October 1

President J. A. Philbrick of the Carolina Giant Cement Company has announced that operations will begin at the firm's new $1,566,000 plant at Harleyville, S. C., about October 1.

Approximately 120 persons will be employed and the annual output is expected to be about 800,000 barrels or 3,200,000 sacks. The plant was built during World War II for the production of alumina.

the lime plant operator

PIT AND QUARRY

by WOLF G. BAUER
Consulting Engineer

PART IV. CONSIDERATIONS IN CHANGING FROM BATCH TO CONTINUOUS OPERATIONS

IS THE present trend toward continuous operation and processing justified in my plant? What are the limits? Where, in the lime industry, is such effort best applied? What are the fundamentals to be considered, and what advantages in economics and product quality may be realized?—Such are some of the questions appearing to the operator upon first considering eventual changes of this kind.

Investigations of operation or process improvements frequently lead to changes in the scheduling of material flow through or between process stages. Three stages may be recognized: (1) batch or periodic stop-go operation, (2) semi-continuous, and (3) continuous or uninterrupted flow. Each method has its own peculiar advantages and disadvantages. Let us discuss how a change from one to the other affects each application.

Definitions All operations fall into one of these aforementioned classifications. Each process or operation may be divided into three stages: (a) the supply or input, (b) the reaction-mixing-conveying or throughput, and (c) the discharge or output stage. Note that these classifications will cover unit-operation (mixing, conveying, materials-handling, reduction) as well as unit-process types, both of which will be considered here.

A batch operation or process is one in which the three stages of input, throughput, and output are carried out in distinct and successive time intervals, the end of each interval usually marking the end of a stage. A periodic or batch process always undergoes changes with respect to time, but not necessarily with distance.

A continuous process or operation may be defined as one in which input, throughput and output are uninterrupted as to stream flow, and in which reaction or mixing changes with distance but never with time in respect to any point along the flow axis. In its ideal concept, the continuous process is a series of infinite numbers of batch processes in which no shortcircuiting takes place, and in which retention time for each particle of gas-solid-liquid is equal.

A semi-continuous process should not be taken as an imperfect continuous process. Due to certain mixing time or separation requirements, several primary batch operations may alternately contribute to a continuous finishing operation, thus showing continuity of input and output but not throughput.

Examples of Applications In the course of processing limestone, lime, and carbon dioxide products, a number of opportunities present themselves for re-evaluating the economics or suitability of batch *versus* continuous methods. The following operations and processes may be considered as examples.

1. Batch to semi-continuous blasting schedule. Here the decision rests with powder economy of large *versus* many small shots, quarry space, and quarry to crusher operating schedule.

2. Semi-continuous *versus* continuous primary to secondary crushing and grinding of stone. Thus the stone processing plant may be synchronized directly to quarrying and primary breaking, as in portable plants, substituting conveyors for trucks etc. without intermediate surge bins and feeders running at other than quarry and primary breaking times.

3. Semi-continuous to continuous calcining. Here the trend has been quite definite. Earliest operations of pot kilns were completely a batch proposition. The subsequent shaft kilns were operated in a semi-continuous manner of filling, slipping and hanging, and lime removal. Evenly-sized material passing through a rotary kiln represents probably one of the most ideal non-short circuiting unit-process continuous methods ever devised. Although mixing normal to the stream axis is not perfect, short-circuiting along the axis is insignificant. All other types of the latest kilns, either operating or in the development stage, are continuous, including such calciners as the Ellernan and Nelson small stone kilns, and the Dorr and the Bauer fluidized solids calciners.

4. Semi-continuous to continuous fuel preparation and burning. Stoker, pulverized fuel, or mechanical gas producer operations have and are continually making inroads into the manual and periodic type of operations.

5. Batch to semi, to continuous hydration. All three methods are in use today in this phase of lime processing. However, the continuous process is still gaining favor for a number of reasons. The Clyde and Weber batch machines, the Jamieson and Victory semi-continuous, and the Schaffer and Kritzer continuous machines are examples. Pressure hydration of dolomite is generally accomplished as a semi-continuous operation.

6. Batch to continuous lime putty and lime mortar production is of frequent interest, as well as production of milk of lime.

7. Semi-continuous car loading is

often made practically continuous from the standpoint of handling bulk as well as packaged products. Such practice aims chiefly at the elimination of personnel for input and throughput operation.

8. Batch to semi-continuous dewatering practice as in pre-drying precipitated calcium carbonate, or wet-ground whiting substitute.

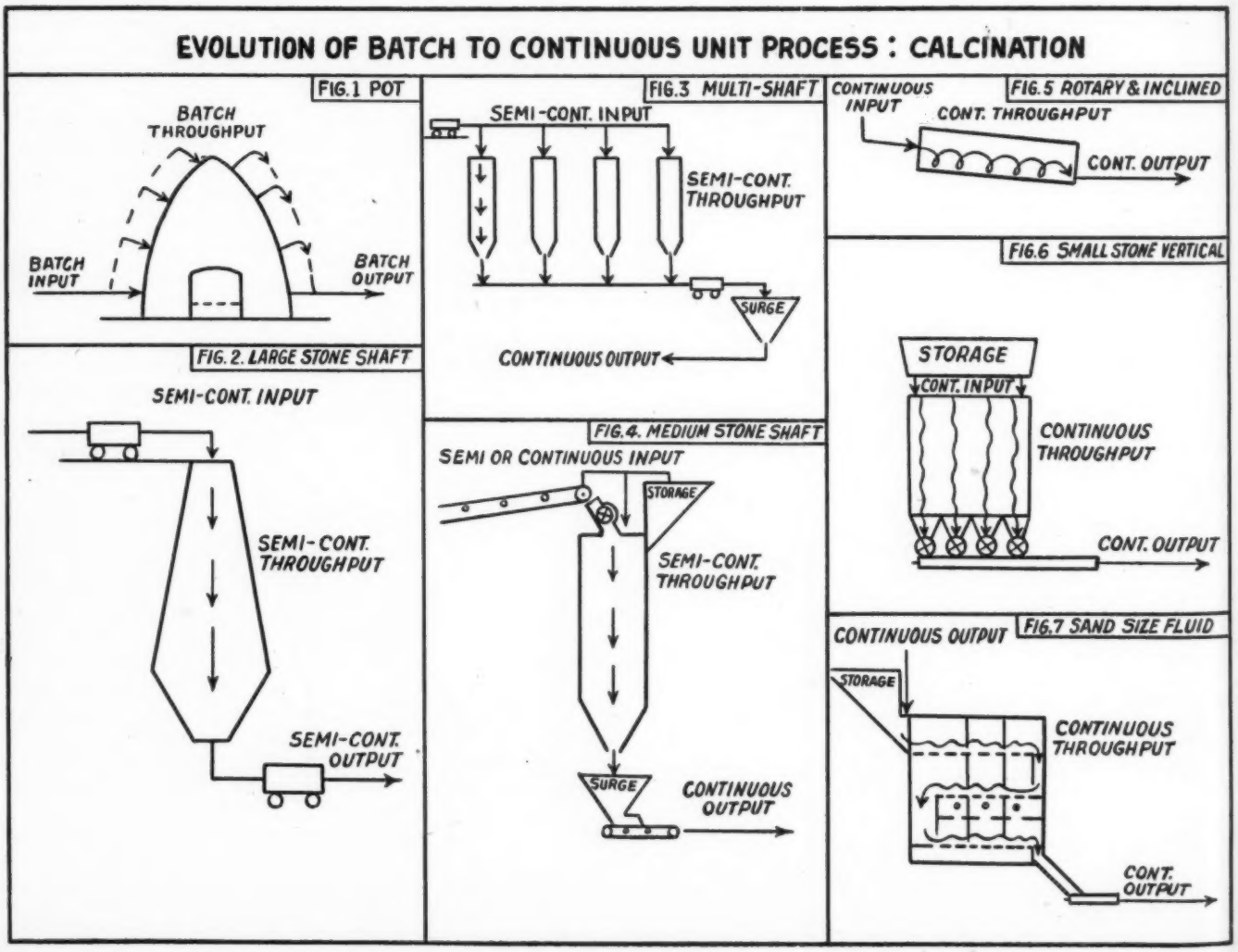
Disadvantages of Continuous Methods Due to certain technical or economical reasons, the change from batch to continuous is not always in favor of the latter. It is generally quite readily established by experiments, however, whether any technical drawbacks may result through such a change-over.

As a rule, those processes or operations which require an extended retention time are best suited to batch methods. Thus absorption or hydration are two examples which, under certain conditions, can be controlled and performed most economically batch-wise. In the reaction $CO_2 + H_2O + Ca(OH)_2 = CaCO_3 + H_2O$ the problems of concentration, settling rate of precipitates, as well as settling distance, hydroxide removal, and large container space necessary for economical output all tend to make it technically and economically difficult to achieve true continuous operation. Certain limes hydrate with great difficulty, and under such conditions the temperature-time promoting factor inherent in large batches tends to establish optimum process conditions. High-pressure hydration of magnesium oxide is another instance which may favor batch or semi-continuous processing, even from the control standpoint. In the case of lime putty production, there is no suitable economic substitute for time in the aging phase. Aside from these instances, however, the advantages of continuity in an operation or process usually outweigh in number and favorable results those involving batch-type techniques.

Advantages of Continuity Continuity is, of course, a matter of degree, and the closer the continuous process approaches that of infinitesimal successive steps of true batch operation, i.e., non-varying reaction or mixing at every point in the stream, but not parallel to the path of motion, the more pronounced will the advantages of continuous operation become. The limits to such an approach are obviously economical, insofar as duplication of successive small batch machinery is concerned.

Probably the first clear-cut improvement that comes to mind is the saving in time ordinarily lost between cycles of the batch technique. This time factor applies to both input and output. When the operation is semi-continuous, these intervals may be staggered to deliver a continuous-effect throughput without resort to excessive surge or holding capacity. Time is generally saved by elimination of heating up, cooling down, filling, emptying, and obtainment of mixing equilibrium in the system.

Another advantage resides in the usually greater ease of process control. This may frequently become the determining factor, irrespective of the economic comparison. Automatic instrument regulation may or may not be more complicated. Temperature, for example, may be made a controlling function in both types of operation. However, in the case of the continuous process, controllers involving the time factor may



not, and usually are not, employed. Stages during mixing or reaction may be isolated along the path of flow, and the smaller mass undergoing reaction in each time interval is exposed to less interference from variables of time-temperature-concentration, or the otherwise unsteady conditions prevailing in many batch systems.

Achieving Continuity In the simplest lime plant, i.e., one which does not go in for processing of by-products or admixtures of lime with other raw materials such as insecticides, ready-mixed plaster, stock feeds, mineralizers, mortar, masons cements, putty, precipitated whiting, carbon dioxide in the gaseous, liquid, or solid form, unit processes are invariably confined to calcination and hydration only. In the more diversified establishments, drying, grinding, fuel gasification, classifying and sizing, cleaning or beneficiating stone or fuel may constitute further unit processes. In either type of plant, however, unit operations are mainly concerned with feeding, mixing, and conveying of material to and from the processing points.

In most changes from batch to semi- or fully-continuous operating methods, reduction of time coupled with automatic control has eliminated labor and labor costs. However obvious the saving in time may appear, it is by no means simple to reduce it, inasmuch as the processing time may be fixed by economical limits of pressure and temperature. Often considerable research is necessary in finding ways and means of altering a particular process such as calcination, drying, hydration, absorption, mixing, etc., in order to decrease the reaction period and adapt it to continuous methods.

In both calcining and hydrating, an increase in temperature and pressure and a decrease in particle size will reduce the reaction time. If not all, then at least one, of these factors may be applied, for it is vital that reaction time be reduced to the minimum in continuous methods.

In the case of lime burning, reduction of stone size is one of the major factors allowing changes from semi-continuous to fully-continuous operating methods and designs to be made on existing kilns. In the case of hydration, increasing the temperature and pressure through judicious use of insulation and steam control in the hydrator converted from batch to continuous will decrease the reaction time to a degree which permits of reasonable lengths of baffled reactors and reasonable costs for such equipment. In earlier discussions on hydration some of these factors were enlarged upon.

In designing or re-designing process units such as kilns, dryers, hydrators, and mixers from batch to continuous throughput, the principles applying to the minimizing of short-circuiting tendencies, and the maximizing of thorough mixing normal to the flow path all hold true. The techniques, however, differ because of the nature of the material and process. Since perfection is never quite possible, the retention time for some particles in a single-pass system or unit is either longer or shorter than required. This forces the designer to provide extra time to reduce the proportion of unreacted material due to short-circuiting or improper mixing, and at the same time provide temperature-pressure-concentration conditions that will have the minimum detrimental effect on the portion of material in the system retained longer than normally.

In a multi-pass system, recycling of a portion of the material stream is put into effect. In the case of dry hydration, certain separating or classifying action may be exercised upon the whole discharge stream, the unreacted portions being made to return to the raw feed. A classic example is the alteration of a Clyde or revolving-pan batch hydrator to a semi-continuous overflow machine. In this case, the unreacted and non-reactive portions are retained, and allowed to accumulate until discharged periodically. This classifying action can also be accomplished in a better-designed, continuous-stage processing system where the periodic removal of such rejects is made continuous.

The cost of separation and cost of loss of the unreacted from the reacted material determines the percentage process completion allowable. This in turn determines the size of the continuous unit, which may be more, equal, or less in volume than the batch unit it replaces. By the same token, the time of a well-designed batch process may be more or less than that of the continuous process replacing it on an equivalent output basis.

Calrock Asphalt Company Closes Davenport Facilities

Pierce Milton, an official of the Calrock Asphalt Company, announced that operations had been permanently suspended at the plant near Davenport, Calif. The $100,000 facilities, opened in 1931, were used for processing sandstone.

During World War II the firm supplied much of the material for surfacing the Stockton air base. Another large contract was for crushed stone used in building the Los Gatos Highway. The decision to liquidate the plant was made because officials had considered it a losing operation for several years.

New Stone Plant

(*From page* 94)

from five gates and delivering to a 100-ton truck-loading bin. Another 30-in. by 140-ft. belt conveyor is to be installed to take off the material at an appropriate point and deliver it to a separate 300-ton steel loading bunker, also to be installed, for fulfilling the harbor contract. The trucks will carry this special stone a distance of about four miles to the San Pedro waterfront where the 1,000-ton-capacity barges will be loaded. At the dock the trucks will ascend a ramp, discharge to a 40-ton transfer bin feeding a 36-in. by 200-ft. belt conveyor which will load the barges at a 500-ton-per-hour clip. Swinging chutes at the end of the conveyor will compensate for the rise and fall of the tide as the barges are loaded.

Sterling motors are used in large part to power the various driven units; many have built-in gear heads for speed reduction. Conveyor rolls and idlers were supplied by the Conveyor Co., Los Angeles.

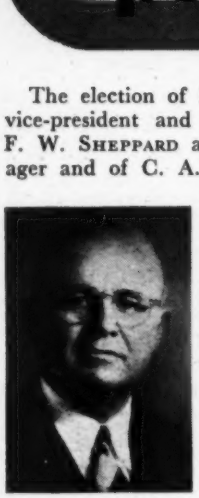
Deliveries are being made by a fine new fleet of 20 Reo 6-wheel trucks and trailers of 22-ton capacity each, all company-owned and operated.

Before forming the Livingston Truck & Materials Co. in Long Beach, Mr. Livingston produced construction aggregates in the San Gabriel Valley area east of Los Angeles for a number of years. His original plant, erected in 1923 and operated as the Livingston Sand & Gravel Co., was consolidated with the production facilities of Graham Bros., Inc., in 1929 and Mr. Livingston was active in the Graham Bros. management until about 10 years later, when he left that organization to establish his own company again.

Construction was started in mid-April on a new plant at Lusk, Wyo., for the recently reorganized Jay Em Stone and Gem Corp. Stone will be obtained from the Rawhide Butte granite quarry near Lusk for processing in the new plant.

personal mention

The election of H. S. ROBERTSON as vice-president and the appointment of F. W. SHEPPARD as general sales manager and of C. A. BRASHARES as sales



F. W. Sheppard

H. S. Robertson

manager of the Birmingham district has been announced by the Harbison-Walker Refractories Company, Pittsburgh, Pa.

Associated with Harbison-Walker since 1916, Mr. Robertson's activities have been devoted almost exclusively to sales. He has been a director of the company since 1943.

A native of South Carolina, Mr. Sheppard was connected with Tennessee Coal, Iron and Railroad Company at Birmingham, Ala., before he joined Harbison-Walker in 1922. Since 1926 he has been Birmingham district sales manager.

Mr. Brashares went into the research department of Harbison-Walker in 1928. He later transferred to the sales technical department and served in both the Pittsburgh and Charlotte, N. C., sales offices.

MELVIN H. BAKER, president of the National Gypsum Co., Buffalo, N. Y., has been elected to the board of directors of the United States Chamber of Commerce.

Mr. Baker will represent the Second District, comprising New York, New Jersey, Pennsylvania and Delaware.

CLAUDE MCMILLAN has been promoted from assistant superintendent at the Ada (Okla.) plant of the Ideal Cement Company to plant manager at Okay, Ark. He will be in full charge of the company's business at that plant, including production planning, sales department relations, plant construction, modification, etc.

BROR DAHLBERG, founder, and president of The Celotex Corporation since its organization, has been elected chairman of its board of directors; Otis S. Mansell, vice-president and comptroller of the corporation and active in its management for over 21 years, has been elected president.

At the same time, CARL G. MUENCH was elected senior vice-president. CHRIS L. CHRISTENSEN, for the last five years vice-president in charge of industrial relations and research, was elected chairman of the executive committee.

HENRY W. COLLINS, connected with the merchandising department since 1923 and for the last ten years vice-president in charge of sales and distribution, was elected executive vice-president.

Two new directors were elected by stockholders of the National Gypsum Company at the annual meeting in the company's main office: LEWIS R. SANDERSON, vice-president in charge of operations, and DEAN D. CRANDELL, vice-president in charge of sales. As members of the board, they replace GORDON H. TARBELL, who has reached retirement age, and RALPH F. BURLEY, who is on an indefinite leave of absence because of illness.

Last November, Mr. Sanderson and Mr. Crandell succeeded Mr. Tarbell and Mr. Burley, respectively, in their present posts.

H. A. SAWYER, vice-president and manager for the Lone Star Cement Company in New Orleans for the last 17 years is the new member of the local dock board. His appointment by Governor Davis was announced in March.

WILLIAM P. MCCUTCHEON of the Union Sand and Gravel Co., Huntington, W. Va., was recently elected president of the local Propeller Club, organization of rivermen and river boosters. However, he was unable to give time to the work and resigned. The Dravo film "The Story of Sand and Gravel" featured the election meeting.

L. M. CASSIDY, vice-president in charge of sales for the Johns-Manville Corporation, has been elected chairman of the board of the Asphalt Roofing Industry Bureau. He succeeds E. W. SMITH, vice-president of the Philip Carey Manufacturing Company.

P. C. ROWE, executive vice-president of the Flintkote Company was named vice-chairman.

EDWARD INGLESBY of the National Gypsum Company, Buffalo, served as chairman of the attendance and registration committee for the annual Western New York Safety Conference held April 13-14 in Niagara Falls.

obituaries

Richard Stiles, a lime salesman for the Warner Company, died on March 28 after a prolonged illness. He had been associated with the firm for the last 38 years in various capacities.

S. HENRY HARRISON, 72, chief engineer for the Vulcanite Cement Company from 1918 to 1933, died in Philadelphia on April 17 after a long illness.

Mr. Harrison was graduated from the University of Pennsylvania in 1898 as a mechanical engineer. After an association of several years with the Vulcanite Cement Company, he went to Cleveland, O., in 1905 with the Osborne Engineering Co. From 1910 to 1912 he designed and erected cement plants in Kingsport, Tenn., and Ragland, Ala. For five years he headed his own engineering firm for the testing of cement and coal. After a year as chief engineer for the Morton Salt Co., Mich., he returned to Vulcanite Cement Co. as chief engineer.

WILLIAM J. MUHLITNER, president of the Great Lakes Foundry Sand Company died on May 10 at his home in Detroit, Mich. He was also a director of the National Industrial Sand Association. He was 56 years of age.

GUY DUNLAP YOUELL SR. manager of the Alpha Portland Cement Company's Powderly plant near Birmingham, Ala., died recently at his home in that city. Mr. Youell was 65 years old.

JAMES F. TWAMLEY, retired vice-president of the Coplay Cement Manufacturing Company of New York, N. Y., died on April 30 at his home in Coldenham, N. Y.

Mr. Twamley had been with Coplay for 40 years, at first as sales manager. In 1940 he became vice-president. He retired in 1942.

ALFRED F. KING, 64, vice-president of the United States Gypsum Company, died on April 16 at a New York hospital after a brief illness.

ALECK OLSEN, 70, retired foreman at the United States Gypsum Company's Oakfield N. Y., plant, died on March 24 in Genesee Memorial Hospital at Batavia, N. Y.

WALKER GLENN MCFADDEN, aged 68 years, who had been an employee of Basic Refractories, Inc., at Bettsville, O., for 25 years, died on April 4 at his home after an extended illness. During his last year with the company Mr. McFadden was custodian of the special refractories plant.

JONAS WOLGAMUTH and his son LEWIS WOLGAMUTH, both employees of Basic Refractories, Inc., at Bettsville, O., were instantly killed on March 12 when their automobile was struck by a late-running train at a crossing near their home. The elder Mr. Wolgamuth was swing shift burner, and his son was a foreman at the Kennedy burning plant. The former began his association with the company in 1916. He was 57 years of age. Lewis Wolgamuth had been an employee of Basic since 1936.

A third passenger in the car, Elmer Warrington, also employed at the plant, was critically injured in the accident.

LENDALL W. POMEROY, senior research chemist at the Johns-Manville Corporation's plant at Manville, N. J., died unexpectedly at his office on April 30. Mr. Pomeroy had been with the firm since 1936. He was 46 years of age.

JAMES S. AMAR, transportation manager of the New York Trap Rock Corporation, died on April 14 at his home at Seaford Harbor, Long Island, N. Y. Mr. Amar had been associated with the company since 1912.

Idaho's Mineral Resources Surveyed by State Bureau

With 21 maps showing known locations of Idaho mineral deposits already completed, work is proceeding on similar maps for each county in the state, the Idaho Bureau of Mines and Geology was recently informed by its director, A. W. Fahrenwald.

Reports also have been published on the utility of Idaho phosphate rock and another on diatomite in southwest Idaho, Mr. Fahrenwald told the bureau's annual board meeting. He said a third report, nearing completion, will cover distribution of heavy alluvial materials.

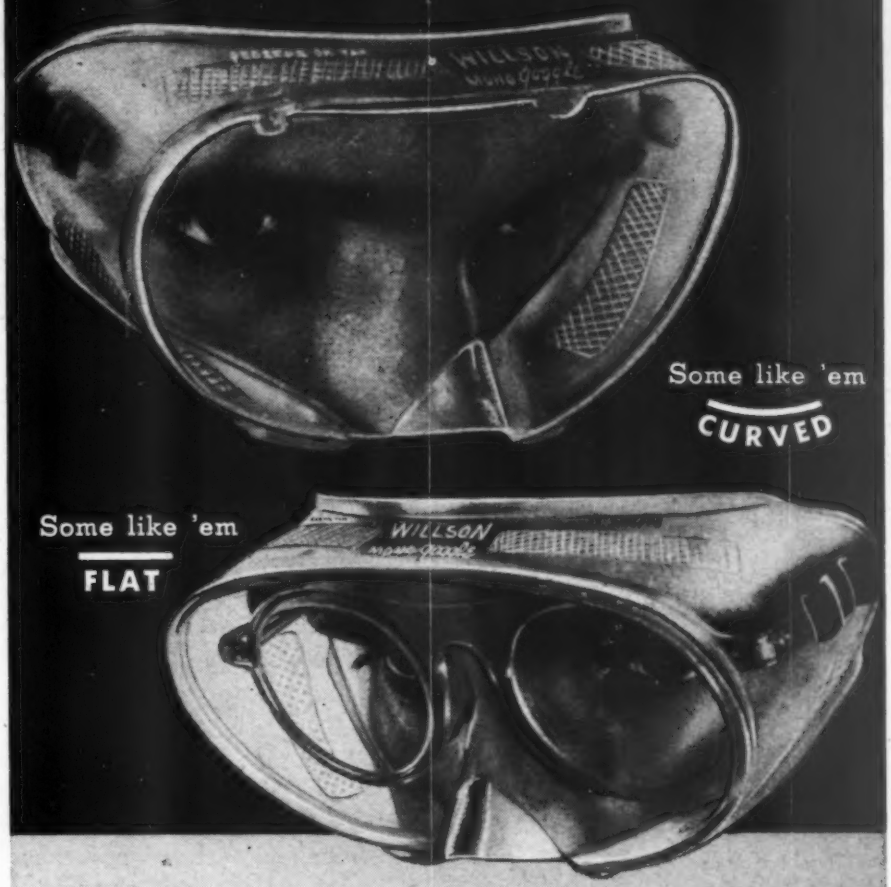
Kansas Chalk Deposits Await Commercial Development

Kansas chalk deposits are sufficiently large and accessible for large-scale commercial development whenever adequate demand for chalk products materializes. That conclusion stems from research conducted last year by the state geological survey at the University of Kansas.

The survey made more than 100 chemical and petrographic analyses of the samples. Laboratory tests showed that pure chalk and intermediate material exists in commercial quantities.

Beds at the base of large formations consist of relatively impure chalk. However, the higher beds contain chalk of purity equal to that found anywhere else in the world.

2 NEW WILLSON MONO Goggles



Newly styled plastic eye protection with choice of curved or flat lenses offer new features designed to add to their already predominant popularity. The WILLSON MONOGOGGLE, just over an ounce in weight, is the answer to getting safety equipment worn on many hazardous jobs.

- The new flat lens design retains all the safety features of the curved lens.
- Both provide ample room for wearing of prescription glasses in comfort. The flat style, however, provides additional clearance for molded spectacle frames.
- New drop-eye shape gives wider vision.
- Greater ventilation area provides better air circulation and more wearer comfort.
- Both new designs available in clear acetate frames or the new flexible, mottled-brown, polythene frame.

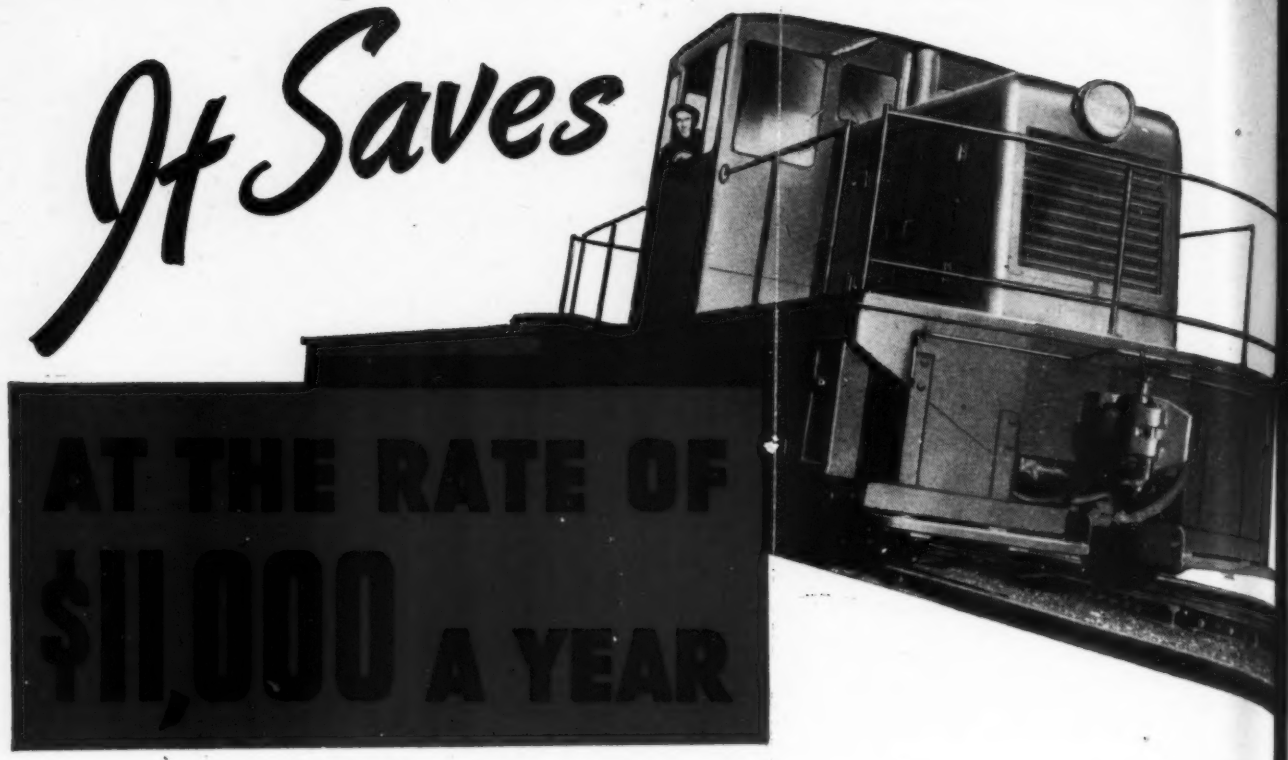
WILLSON*

For complete information on these products and their application, as well as other eye and respiratory protective devices, get in touch with your Willson distributor or write us direct.

*T. M. Reg. U. S. Pat. Off.

WILLSON PRODUCTS, INC., 102 THORN STREET, READING, PA.

It Saves



"The 45-ton General Electric diesel-electric locomotive which we recently placed in operation has surpassed our expectations, and our only regret is that we did not replace our large steam locomotive at an earlier date." G. R. Kilbourn, Plant Engineer, Marion Power Shovel Co., Marion, Ohio.

Last September a G-E 45-ton switcher replaced an old 50-ton steam locomotive at the Marion Power Shovel plant. A few months later Mr. Kilbourn compared costs and found plenty of reasons for enthusiasm.

At the present rate of saving the new switcher will pay for itself in *less than three years*. Savings in fuel, labor and maintenance cut the hourly cost from $7.13 for the steamer, to $3.17 for the diesel-electric. While the steamer operated 16 hours a day, 5½ days a week at an annual cost of $32,626, the G-E diesel-electric operates nearly 50 per cent more hours at an estimated annual cost of only $21,532. At this rate savings will average over $11,000 a year *even though the new G-E switcher is working 50 per cent longer, with additional fuel and labor expense.*

The diesel-electric works 5½ days a week, 24 hours a day, except for 15 minutes required for daily refueling. There are no ashes to haul, no fire boxes to maintain. Seven days a week it is ready for *immediate** operation 96% of the time.

HOW MUCH WILL YOU SAVE?

You'll want to compare this performance with that of your own locomotive—find out for yourself the savings you can make in your plant. Simply call your nearest G-E representative today. He'll survey your own switching needs and estimate your savings in advance. No obligation. *Apparatus Department, General Electric Co., Schenectady 5, N.Y.*

***PUSH-BUTTON STARTING**

G-E diesel-electrics start at the push of a button. No time lost getting them ready for work. Simply open the throttle and the locomotive accelerates quickly and smoothly.

Switch to Diesel-electrics

And Save!

GENERAL ELECTRIC

120-36

new machinery and supplies

PIT AND QUARRY

● Revolving Scoop

The full revolving "Quick-Way" scoop is designed to meet a need for equipment suited to cleaning corners, loading gravel, coal, dirt or other aggregate. The scoop operates from all angles and digs and dumps in tight places. The truck moves but very little during most of these operations.

This device is available as a standard attachment for Model E and Model J Quick-Way truck shovels. The 4-ft. Model J scoop has a ⅜-cu. yd. capacity and the 5-ft. Model E gives a ⅝-cu. yd. capacity. The Model E has a dumping radius of 6 ft. 11 in. to 16 ft. 7 in., a dumping height of 3 ft. 7 in. to 16 ft. 6 in., and a digging radius of 14 ft. 4 in. to 19 ft. 5 in.

The scoop is interchangeable with other Quick-Way attachments such as shovel, crane, dragline, trench-hoe, clamshell, pile-driver and back-filler, all of which mount on any truck of the proper size. Quick-Way Truck Shovel Co., Denver 5, Colo., is the manufacturer.

● Phosphate Spreader

The Porter phosphate speader, manufactured by the Liberty Engineering Co., Roscoe, Ill., reportedly will spread phosphate at the rate of 30 acres per hour. A device for wind stoppage which lays the phosphate close to the ground makes for even spreading, economy and continuous operation. Two collapsible wings open out for spreading making a coverage 17 feet wide. The spreader is synchronized with the speed of the truck. No material can fall when the truck is on the road.

The "Porter," having finger-tip cab control, will allow the operator to spread as little as 100 lb. or as much as 600 lb. per acre.

Cast steel and high-alloy metals are used throughout. All bearings are of the greasless type. The spreader can be adapted to trucks with dump bodies, tractors, V boxes or platforms. The same drive can be used with a lime spreader. The unit may be self-mounted or factory-mounted to any conveyance.

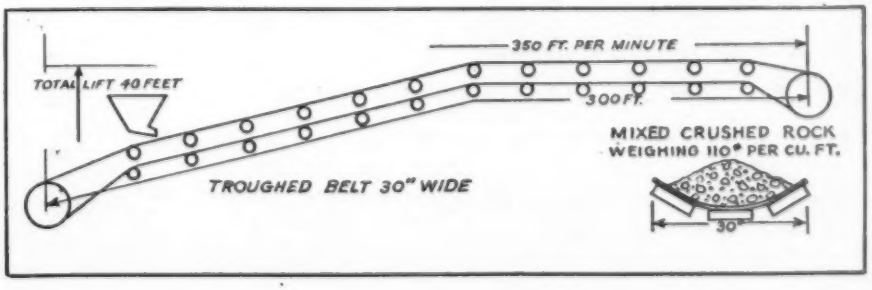
● Conveyor Belt Data

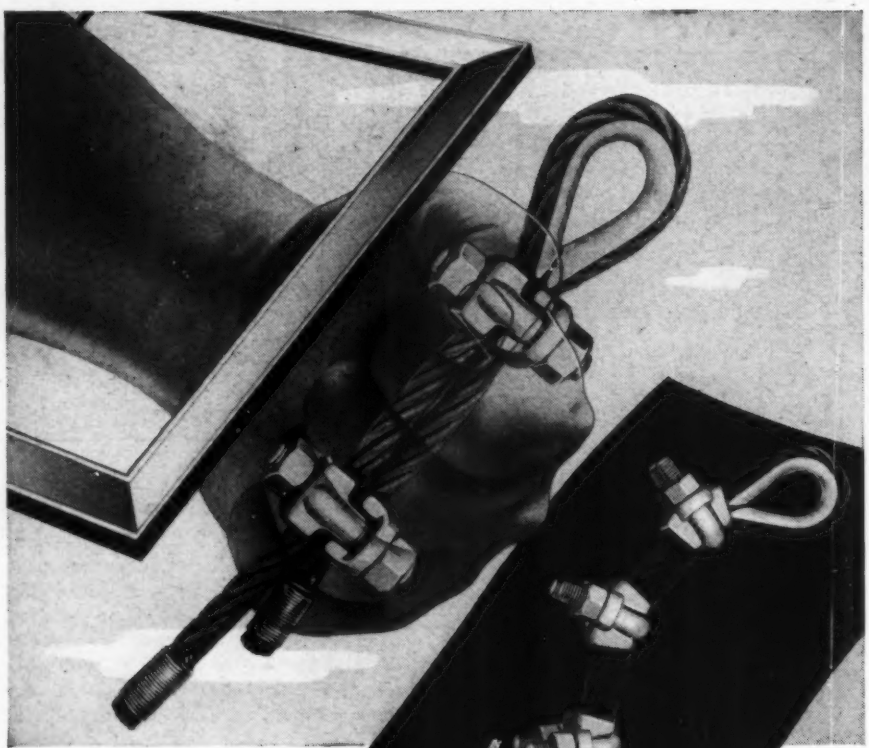
Besides depicting the wide variety of industrial rubber products manufactured, the new 96-page catalog of the American Rubber Mfg. Co. is a valuable reference book for pit-and-quarry operators.

Of particular interest are the complete data sections on belt conveyors and belt-bucket elevators. Producers who are fortunate in having a copy have, at their finger-tips, condensed information the proper use of which can save many dollars in operating costs and shut-down time, its editors point out.

A typical example is the conveyor problem illustrated in the sketch. Here, an operator would employ a 30-in. belt on 300-ft. centers to handle crushed rock weighing 110 lb. per cu. ft., total lift being 40 ft. with speed of belt travel 350 ft. per min. Computations from data tables indicate that the capacity of such an installation would be approximately 600 t.p.h., that the power requirement is 36.7 hp. Net belt tension would be 3,460 lbs. requiring, theoretically, 7.8 plies in the belt for 180 deg. contact on bare iron pulleys, or 4.7 plies with tandem drive and lagged pulleys. On high-grade belting with high friction value and breaker fabric, the fractional ply may be disregarded. Where friction values are low and there is no breaker fabric, the next higher ply should be used.

Requests for copies may be addressed directly to the American Rubber Mfg. Co., 1145 Park Ave., Oakland, Calif.





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Only The Laughlin "Fist-Grip" Safety Clip Gives You Service and Protection Like This:

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Super Grip . . . two clips do the work of three

Extra Strength and Safety . . . entire clip, including bolts, drop-forged

"Fist-Grip" Clips develop 95% to 100% of the rope strength. They can make important savings in time, money and rope . . . for *you*. Distributed through mine, mill and oil field supply houses. WRITE FOR LAUGHLIN'S CATALOG #140 . . . up-to-the-minute data on industrial fittings.

THE THOMAS LAUGHLIN CO., DEPT. 3, PORTLAND 6, MAINE.

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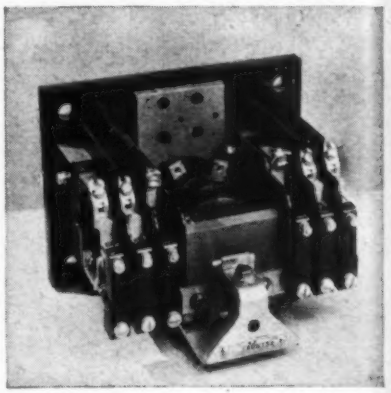
THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

● Magnet-Operated Relay

A new heavy-duty, rear-connected, multiple d.-c. magnet-operated relay is announced by Westinghouse Electric Corp. Designated the AYB, the new relay is available in combinations from 4 to 14 poles.

This relay is designed for operation up to 600 v. All contacts are double



break silver to silver, will carry 10 amps. continuously at a rated voltage, and have a maximum interrupting capacity of 150 volt-amps.

The new relay may be had with contacts that operate all normally open or with combination of open and closed. To prevent overloading the magnet, not more than five normally closed contacts should be used in the combination.

The AYB relay is a self-contained unit with all component parts mounted on a ½-in.-thick Micarta back plate and may be mounted on a control panel 2 inches or less in thickness. The relay is designed for adaption to heavy-duty applications requiring interlocking of circuits. Westinghouse Electric Corp., 306 4th Ave., Pittsburgh 30, Pa.

● Applicator Bars

A recent bulletin of the Stulz-Sickles Company features the regrousing of worn-down tractor treads with manganal special-shape applicator bars. The company produces these bars in five styles, all suitable for replacing tractor grousers, clamshell bucket lips and making grates. They are made of Manganal, a special-analysis of manganese-nickel steel which is described as "the toughest metal known, not harmed by heat".

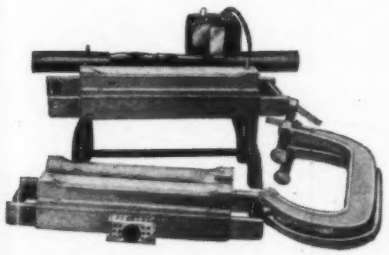
Special-shape applicator bars may be attached with Manganal bars welding electrodes or Manganal special "Tite-Kote" welding electrodes. (The company furnishes a table giving the number of feet needed for various makes of tractors.) Each grouser should be cut 1 inch shorter than the original length.

The bar should be tack-welded on one end so that it is set off about 3/32 in. from the old grouser. Only one pass is needed on each side of the grouser; peening the weld deposit is not necessary. The ¼-in. Manganal electrode is recommended for maximum welding speed. The bars are made in 16- to 20-ft. stock lengths and may be cut with an acetylene torch to the desired length.

Manganal special Tite-Kote welding electrodes are also used for repairs to idler wheels, sprockets and rollers.

● Splice Vulcanizer

Two new model cable and belt splice vulcanizers are now in production at The Shaler Co. Model A is for repairs on cable up to 8 inches in length and ¼- to 2½-in. outside diameter, while Model CV, illustrated, accommodates re-



pairs up to a foot in length and 3½ inches in diameter. These vulcanizers consist of two standard heating plates provided with automatic temperature control in the form of a built-in thermostat which holds the vulcanizing temperature to 285 degrees. Aluminum heating blocks hold the cables or rubberized fabric belts during the repair period. The Shaler Co., Waupun, Wis.

● Power Hoists

The Domestic Engine & Pump Company, Shippensburg, Pa., offers a line of power hoists in heavy, medium and light duty models, both single and double drum. The heavy-duty type is powered with 4- or 6-cylinder, 4-cycle industrial gasoline engine.

Power is transmitted from the engine to the lay shaft by a silent chain running over machine-cut sprockets. The engine is equipped with friction clutch, permitting operation of the engine for inspection or adjustments independent of the hoist and gearing. A speed control lever allows the engine speed to be minimized for idling and increased for hoisting.

A lever attached to the engine friction clutch gives the operator control of the winch, as well as the hoist drum, a desirable safety feature for quick stopping in case the load line overrides on the winch.

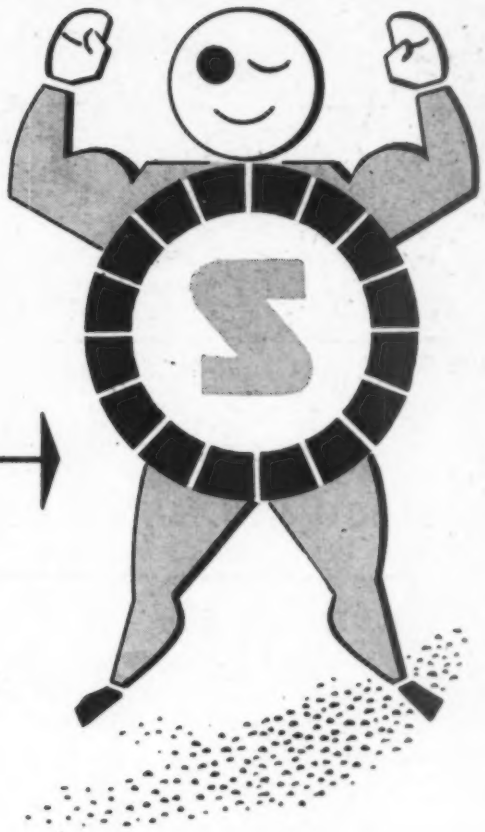
The thrust apparatus consists of a heavy steel screw and yoke which pushes against the hub of the drum through a thrust bearing consisting of two hardened and ground steel plates with a bronze plate between. The screw also pulls the drum out of engagement by a positive movement, giving the operator absolute control of the load.

The drums are semi-steel, bushed with anti-friction metal. The winch is keyed to a drum shaft outside the journal box and is provided with steel ratchet and pawl.

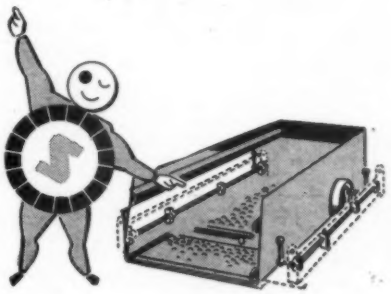
● Lubrication Chart

Lubriplate Division of the Fiske Brothers Refining Company, Newark, N. J., has worked out a convenient lubrication data chart which is available to anyone writing for it on company stationery.

It is a pocket-size sliding finder with windows indicating Lubriplate product data, product number and the application of the product. On one side recommendations are given (in condensed form) for the various lubricants.



Let SECO solve your vibrating screen problem

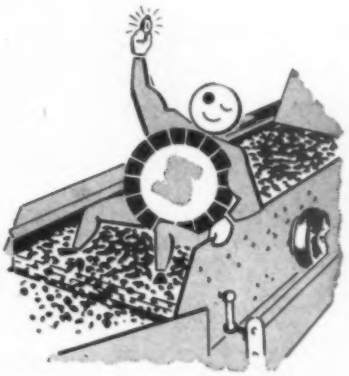


GET THIS EXCLUSIVE FULLY CONTROLLED TRUE CIRCULAR ACTION

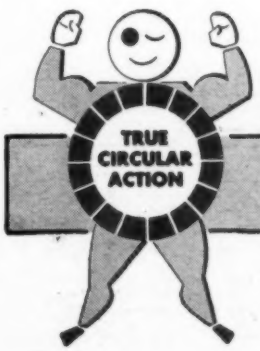
Regardless of what material you screen, you'll benefit by Seco's smooth, trouble-free performance. Seco's patented equalizer assembly (in outline) controls the action of the screen body with resultant true circular action under all load conditions.

SCREEN MORE TONS PER HOUR

The smooth action of a Seco keeps the load moving, reduces blinding and plugging of the meshes and by so doing—increases tonnages. Thousands of enthusiastic Seco users coast to coast have proven this. There's a right Seco for your screening job, too!



Write Dept. L for A Guide to Better Screening



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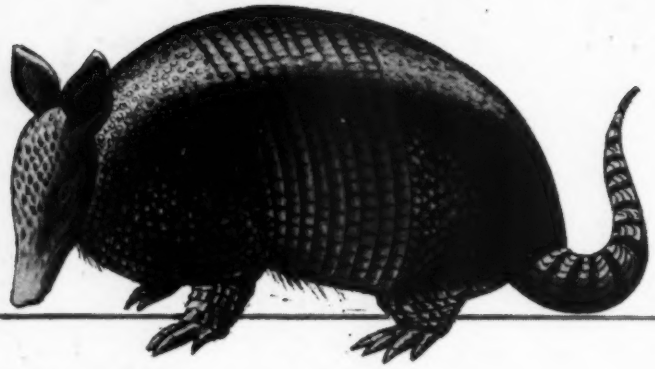

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● Think what today's bigger, heavier equipment does to your blocks and sheaves. Greater strains . . . faster sheave speeds . . . harder knocks . . . terrific wear and tear on shells, hooks, shackles, pins and axles! To meet these new needs, AMERICAN Blocks and Sheaves are built with *armored construction*. Heavy steel side plates and straps. Tough forged steel wherever needed. *Extra* strength, *extra* ruggedness, *extra* serviceability. AMERICAN Blocks and Sheaves, made for wire rope only, come in many types and sizes from 1½ to 250 tons capacity. Your distributor has them in stock.

only "American" Blocks and Sheaves have ***armored construction***

Thick steel side plates, extended beyond sheave flanges, prevent breakage
Heavier pins and axles
Tough steel reinforcing straps
Sheaves of hard iron or alloy steel . . . thick flanges, precision shaped grooves
Self-lubricating bushings, bronze bushings, or anti-friction bearings
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For fastening wire rope, use genuine CROSBY CLIPS—Made of highest quality drop-forged steel, hot dip galvanized. To make sure you get genuine CROSBY CLIPS, look for the famous Red-U-Bolt. All sizes—⅛ to 3 inches. Distributors everywhere.

AMERICAN HANDIWINCH

Gives one man the power of a crew. HANDIWINCH weighs only 95 lbs. Can be carried and set up anywhere; handles lifting, loading and pulling jobs up to 5 tons. All steel construction, cut gears. Ask your distributor.

● Laboratory Furnace

Temperatures up to 3,000 deg. F. and continuous operation up to 2,500 deg. F. are features claimed for the Lindberg G-10 laboratory box furnace, which is offered by the Boder Scientific Company, 719-721 Liberty Avenue, Pittsburgh, Pa. Top heat can be used intermittently.

The working chamber, door lever and the most important controls are located at convenient levels. All necessary instruments and accessories are mounted inside the supporting base, which encloses the front, sides and back. Working parts are reached through the mesh guard plates at the back of the furnace. The furnace shell is insulated with 3,000-deg. F. insulating brick, backed up by block insulation.

A counter-balanced work chamber door lifts vertically, so that the hot side is away from the operator.

Heating is evenly distributed by ten silicon carbide Globar heating elements, equally spaced at the top and bottom of the work chamber. The 3,000-deg. F. top heating capacity provides any lower operating temperature desired, according to the manufacturer.

● New Electrode

The Wilson Welder and Metals Company, Inc., has announced the availability of the new Wilson No. 109 all-position arc welding electrode for welding of mild steel. This electrode, available in ⅛, 5/32, 3/16, 7/32, ¼ and 5/16-in. diameters was developed to fill a definite need for an electrode of the E6012 class with its special characteristics.

According to the manufacturer, the new Wilson No. 109 electrode maintains a high degree of welding performance throughout the entire length of the electrode when high welding currents are used. Excellent operating characteristics with a minimum of spatter are reportedly obtained with either a.c. or d.c.

● Kilroy on Wheels

"Kilroy", a portable service station for servicing mechanized units operating on heavy construction jobs, is a new product by Jax, Inc., Pittsburgh, Pa. It was developed by John Adler, former lubricating expert for a large oil company.

Housed in a 21-foot, four-wheel trailer, the new mobile service unit is 8 feet 3 inches high, is safely under the highway maximum 96-in. width, and has a gross vehicle weight of 18,000 lbs., more than 3½ tons of which is fuel and lubricant payload. Contained are 700 gallons of gasoline and diesel fuel, 200 gallons of different oils and greases, 60 gallons of water or antifreeze, quantities of kerosene, and compressed air for tires and other uses.

The portable service station may be moved to a job site under tow of any conventional truck type tractor. Coupling or uncoupling is quickly made, thus freeing the tractor for other use. The service unit can take up location convenient to construction work under way and because of its great mobility and low center of gravity can go anywhere, just as the legendary character for whom it was named.

Because an operating crew of four can simultaneously service two pieces of equipment in 15 minutes, Kilroy's mobility will greatly reduce the "dead time" runs to remote service facilities.

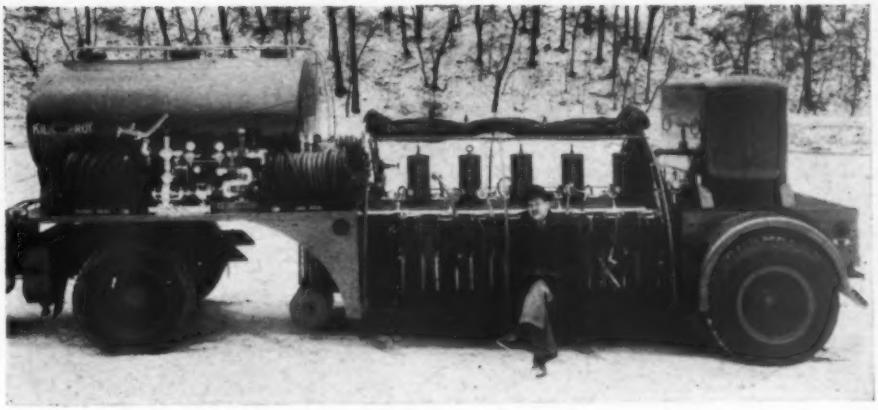
The "heart" of Kilroy is a 60-cu. ft. gas-driven air compressor. All operations from fueling to filling radiators are air-controlled and air-operated. Explosion-proof air motors dispense both fuel and lubricants, and, by means of pressure regulators on each of 18 service outlets, pressures ranging up to 7,000 lbs. p.s.i. may be maintained on individual outlets, thus assuring selective pressures for bearings being serviced.

This air compressor is also used to fill Kilroy's own fuel reservoirs at the rate of 50 g.p.m. on a suction lift of 20 feet.

● Combination Hoist and Jack

Complete in only three pieces (stand, hoist and handle), a new hoist-jack developed by Coffing Hoist Co. has a rated capacity of 2,200 pounds, yet weighs only 23 lbs. complete.

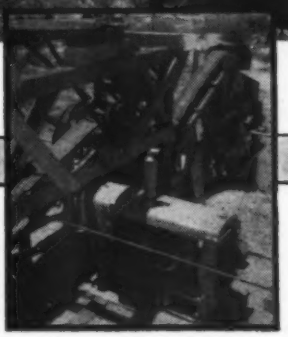
This Coffing hoist-jack features a hoist whose ratchet-and-pawl construction uses the smallest possible number of working parts; a "safety-load" handle designed to bend at maximum overload before there is any possibility of the chain breaking or of the hooks straightening out; a stroke (which, at the top, brings the handle to a level just even with the top of the hoist frame horizontally) raises or lowers the load (thus requiring very little headroom), and is so compact that when taken apart it can easily be carried in a tool box. Coffing Hoist Co., Danville, Ill.



John Adler, inventor of the mechanical Kilroy, with his brain-child.

CUT COSTS!

ON PIT LOADING...



with MINNEAPOLIS-MOLINE MM MODERN MACHINERY

6 Forward, 6 Reverse Speeds

Is this what you want in pit-loading equipment?... *in Maneuverability?... in Big Capacity?... in Easy Handling?* If the answer is "yes", see how you can cut costs with the MM "UTIL". It has 6 forward and 6 reverse speeds—18:00-26 rear tires for extra flotation—10,000 lb. front-end capacity—special heavy Ross steering gear. These and many other features equip MM industrial tractors for *fast, profitable, easy handling* on front end loader jobs.

MM Industrial Tractors are famous for the same *dependable, economical* performance that has made MM Power Units the choice for powering crushers, pumps, screens and conveyors. MM Power Units range in size from 25 to 230 HP.

Plan to see MM Modern Industrial Tractors and Power Units on Display at the Road Show in Chicago.

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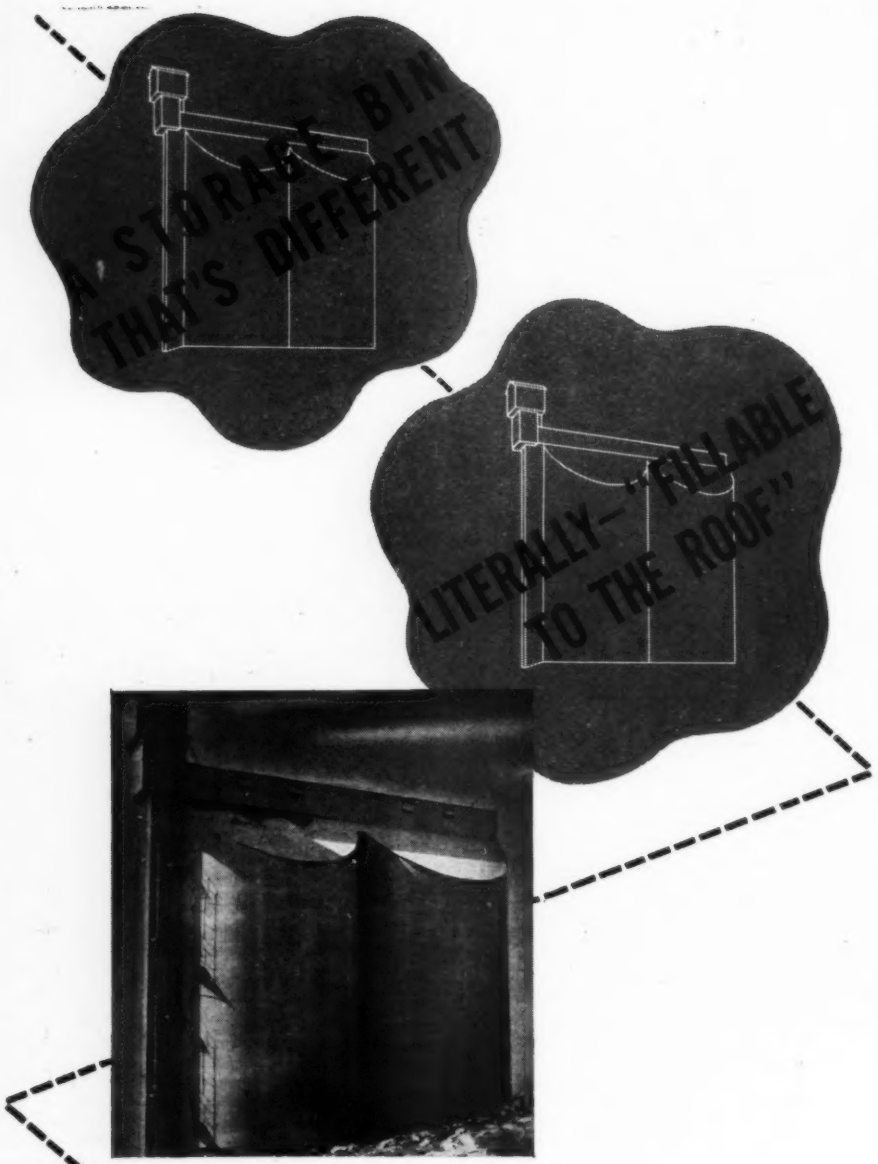
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA



N Note the sloping roof of this bulk storage and handling plant? It's designed that way for two reasons: (1) the material handled, asbestos ore, has a natural slope of about the degree shown; therefore, when filled, there are no waste air pockets; and (2) the slope provides a good water shed and reduces the snow load in winter.

This storage bin, designed and constructed for an asbestos firm in Vermont, is a good example of the way we depart from conventional treatment when the nature of the material and the location of the plant call for the unusual.

Your project for concrete bulk storage and handling plant — if placed with Nicholson — will be in the hands of specialists broadly experienced in the design and construction of concrete bins and tanks.

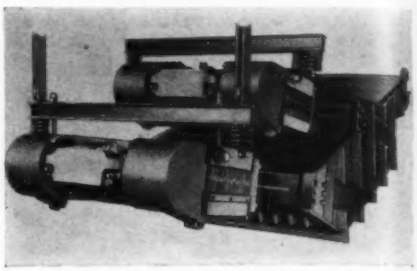
CONSTRUCTION costs are not coming down! BUILD NOW!

BULK STORAGE · COAL-GRAIN-LIQUIDS STORAGE · HANDLING EQUIPMENT
THE NICHOLSON CO.
CONSTRUCTION · CEMENT-OIL-CHEMICALS

TEN ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

● Grizzly Feeder

Specially designed for the large capacity separation of crusher feeds the F-55 double magnet, heavy-duty electric vibratory grizzly feeder illustrated is the latest



addition to the Syntron line of vibratory grizzly feeders which already include the models F-33, F-44 and F-45.

These grizzlies are available in different sizes and styles, either single or double magnet, with the magnets mounted above the deck or below, all featuring the variable control of the rate of feed and with either full or partial grizzly decks.

Operation is from 220 volt, or 440 volt a.c. The small models, the F-1, F-21, and F-22 can also be operated from 110 volt, a.c.

● Pre-Engined Conveyor

Pre-engineered super-service conveyors, made by Pioneer Engineering Works, Inc., includes the following: steel lattice sectionalized frame (set-up sections or knocked down); terminal pulleys, shafts, and anti-friction bearings; countershaft, gears and anti-friction bearings; troughing idlers (Timken bearing); return idlers (Timken bearing); receiving hopper.

When required according to engineering standards, the following items are included automatically: lagging on head pulley, snub pulley, gravity belt tightener.

The following accessories are available and will be furnished when specified: conveyor belt, motor mounting, v-belt drive, motor.

The conveyors in complete packages are offered in belt widths of 18, 24 and 30 inches. Lengths are from 30 feet to 120 feet in 5-ft. increments.

In order to pre-engineer these standard package conveyors, they have been designed to handle the rated capacity at a speed of 300 feet per minute and at a slope not to exceed 18 degrees.

● Vertical Gearmotor

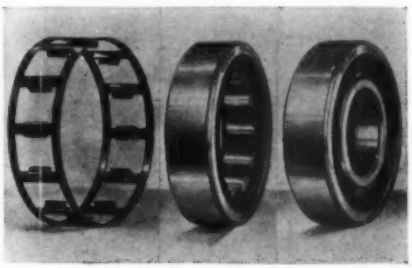
A new vertical gearmotor is the latest addition to the Westinghouse gear drive line. Each unit is a self-contained drive, consisting of a high-speed motor and a speed-reducing unit. Nine different gear ratio combinations are available, ranging from 7.61:1 to 38.9:1.

These self-contained vertical gearmotors are available in 3 to 50 hp., 220, 440 or 550 volt, 3-phase, a.-c., and 3 to 7½ hp., 115 or 230 volt, d.-c. They may be equipped with practically any standard motor in a variety of enclosure types, including open protected, semi or totally enclosed, and explosion-proof.

Special features in this new vertical gearmotor are the design of the gear case, which is such that all gears and bearings receive positive lubrication at all operating speeds; single helical gears and pinions of 40 to 50 carbon steel for silent operation; maximum strength and tooth overlap; uniform loading, and lower impact stresses from sudden shocks or reversals.

● Precision Roller Bearings

The Rollway Bearing Company, Inc., Syracuse, New York, announce "Tru-Rol," a new precision cylindrical roller bearing with steel retainer. The Tru-Rol



bearing complements the Rollway lines of cylindrical roller, radial, and thrust bearings. Among the new features of the Tru-Rol bearing is the distinctive Tru-Rol (patent applied for) one-piece steel retainer with pockets having deep, broad, double flanges, or guide lips in which the rollers are kept in alignment, insuring long life by correctly guiding the rollers.

Additional bearing components are the outer race with its deep, accurate ring grooves in the inside diameter. The heavy, substantial snap rings that retain the roller retainer and rollers in the outer race fit into the inside diameter. The inner race is separate and interchangeable.

Tru-Rol bearings are manufactured in a range of sizes conforming with S.A.E. standards for roller bearings. Any Tru-Rol bearing can be applied with or without the inner race, depending on the application required.

● Light-Weight Wagon Drill

Ingersoll-Rand Company has developed a new, light-weight wagon drill designed for use in the construction, building and mining fields. Known as the "Wagonjack," the machine combines the drilling stability of a wagon drill with the portability of a "Jackhamer." Lightweight construction, centralized controls, and ball bearing, pneumatic-tired wheels allow the machine to be transported, set up, and operated by one man.

Capable of mounting either the J-50 "Jackhamer" of the DA-30 drifter, the Wagonjack features a chain feed which is driven by a van-type air motor. Adjustable anchors permit taking up slack in the chain. A self-locking worm gear prevents the drill from jumping forward when a soft spot is encountered. Stop bolts equipped with buffer springs prevent over-travel of the drill at the back end of the tower, and the steel-centralizer bracket performs the same function at the front end. Control handles for both the drill and the air motor are grouped on the air motor mounting, which may be raised or lowered on the tower to suit the operator. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

For more than 22 years Cincinnati Rubber Products have contributed to the smooth operation of this Indiana plant. Cincinnati has been their "buy" word for conveyor belts, transmission belts, dredge sleeves and suction hose. Cincinnati has repeatedly replaced Cincinnati . . . the rubber products that have proved their ability to wear best . . . perform best under all conditions.

Take a tip from this plant . . . switch to Cincinnati Rubber Products for your next requirements.

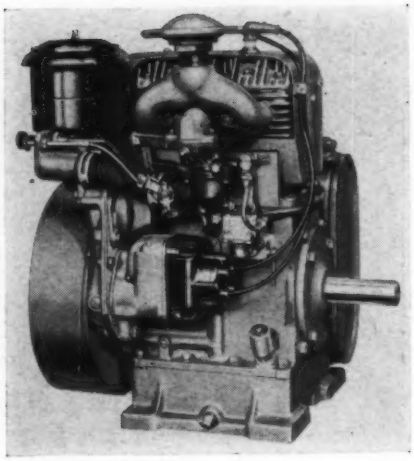
CINCINNATI RUBBER MFG. CO.
CINCINNATI 12, OHIO

CINCINNATI RUBBER

● Air-Cooled Engine

Kept closely "under cover" for the past three years, the latest addition to the famous line of Wisconsin heavy-duty air-cooled engine now has been presented to the power-equipment trade. It's a two-cylinder job, supplied in two models, "TE" and "TF". These engines round out a complete line of 4-cycle air-cooled engines, from 2 to 30 hp., now available in single cylinder, two-cylinder and V-type four-cylinder types.

The new engines embody the same basic heavy-duty design and construction features that are characteristic of all Wisconsin air-cooled engines—such as Timken tapered roller bearings at both ends of the counter-balanced, drop-forged crankshaft; weather-sealed high-tension outside magneto equipped with impulse coupling for quick starts in any weather, at any season; hone cylinders; super-finished crankpins; extra-long connecting rods (2½ times the length of the crank throw); pump lubrication with individual oil stream to each rod; fuel pump as standard equipment; built-in flyball governor; oil bath air cleaner; ¾-in. standard float feed carburetor.



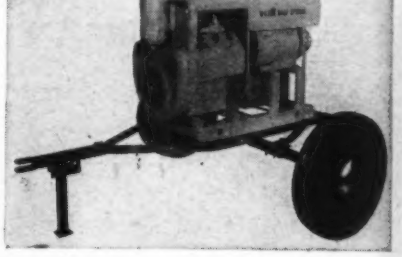
The Model TE, operating at 1,600 to 2,600 r.p.m. carries ratings of from 8.3 hp. to 11.2 hp. The Model TF, at the same speeds turns up from 9.9 to 13.3 hp. The standard engine weighs 220 lbs.

These engines can be supplied with electric starter and generator, clutch take-off assembly and clutch reduction assembly. They are regularly furnished to operate on gasoline, but can be furnished to burn other fuels.

● Welding Machine

Air Reduction Sales Company announces the availability of the new Wilson "Wasp Special" air-cooled, engine-driven arc welding machine.

This new 200-ampere arc welder has a welding range of 25 to 250 amperes at



30 volts, 50-percent-duty cycle. It is a lightweight machine that is easy to handle and adapted to work in places inaccessible to larger and heavier equipment. Two outlets are provided which may be used for lighting purposes or to operate universal power tools in an emergency.

● Hot Materials Conveyor Belt

Development of a hot materials conveyor belt that is cushioned with rubber and strengthened with glass has been announced by the Hewitt Rubber Division, Hewitt-Robins Inc., of Buffalo.

Simultaneously, Hewitt engineers also revealed a glass-fiber rubber hose that resists acid and gives longer service than standard cotton - yarn - reinforced hose,

In the use of the new hot materials conveyor belting, Hewitt has found it will not char or lose strength from heat under 350 deg. F., nor will it lose strength at the fasteners by heat burning out around bolts. It will not stretch for there is very little elongation in fiberglass fabric. The plies are as strong as steel of equal weight.

The Hewitt Fiberglas high pressure steam hose provides increased flexibility under high temperature service conditions and resistance to hardening and stiffening. It gives rugged wear and long life under super-heat conditions, according to the manufacturer. Hewitt Rubber Div., Hewitt Robins, Inc., Buffalo 5, N. Y.

Amazing NEW ROCK DRILL Whirli Bit

It's a radically different revolutionary development with these super-features:

1. Fastest penetrating bit available
2. Drills uniform diameter holes
3. Positive chip cleaning action
4. Stays sharp through hours of use
5. Eliminates blacksmithing
6. Fits standard threaded hollow drill steel

"It's a Whirlwind"

for fast, economical drilling of small holes ¾" to 1⅛" in diameter.

"Whirli Bit" is especially adapted to production drilling of plug holes for cutting monumental and dimensional stone, and for drilling anchor bolt holes for lagging machinery.

It is used with a jack-hammer, and attaches to the hollow drill steel like a detachable bit.

Fortified against wear by the tungsten carbide inlaid insert, "Whirli Bit" can drill hundreds of holes in the hardest stone without replacement or re-dressing.

"Whirli Bit" will increase drilling speed up to *six times*, while cutting costs proportionately.

WHIRLI BIT with tungsten carbide insert

Write for Information

ROCKBIT SALES AND SERVICE CO.

2514 E. Cumberland St., Philadelphia 25, Penna.

trade notes

Directors of Cummins Engine Company, Inc., have named three new vice-presidents and one new director for the ensuing year.

L. W. Beck

The newly elected vice-presidents are L. W. Beck, vice-president in charge of sales; D. J. Cummins, vice-president for engineering; and W. M. Harrison, vice-president and treasurer. Carl R. Fox, who has been vice-president and works

D. J. Cummins

W. M. Harrison

manager for several years, is the newly elected director. He continues in both these positions.

J. A. Bulter has been named treasurer of The Falk Corporation, it was announced today by the board of directors. Formerly assistant treasurer and comptroller, he has been associated with the company for 11 years. He has been assistant treasurer since 1941. Richard S. Falk, assistant to the president, is the new assistant treasurer.

Nelson V. Joyce has been named vice-president in charge of purchasing for the Swan-Finch Oil Corporation, Rockefeller Center, New York City. He has recently served as vice-president in charge of the Western department. J. M. Parker Jr. has been appointed sales manager of the company's tractor division.

Joseph P. Kleinkort has been appointed general manager of the Rampapo Ajax Division of the American Brake Shoe Company. He was formerly Eastern district sales manager.

Hewitt-Robins, Incorporated, announced today the settlement at midnight last night of the 9½-week strike at its Hewitt Rubber Division plant in Buffalo by an agreement with the United Rubber Workers, Local 188 (CIO) for a 10-cent-an-hour wage increase covering nearly 1,000 employees.

Bemis Bro. Bag Co. has purchased a 27-acre industrial site near Wilmington, Del., for the construction of a paper bag manufacturing plant, it has been announced by H. H. Allen, vice-president. This will be the twenty-eighth Bemis plant and the seventh one in which multiwall paper shipping sacks are manufactured.

Marion Power Shovel Company announces the appointment of John R. Hildinger as sales representative, with headquarters at the main office and factory in Marion, O. Mr. Hildinger's territory includes western Ohio, a large part of the southern peninsula of Michigan and the eastern half of Kentucky.

Harry W. Banbury, Stephens-Adamson district manager of the Pittsburgh territory, announces that the firm's offices were moved on April 1 to 1408-9 Investment Building, 237 Fourth Avenue, Pittsburgh.

M. F. Williams, formerly retail manager for International Harvester at Wichita, Kan., in the motor truck branch, has been transferred to the San Antonio, Tex., truck branch as assistant manager. F. C. Mayer, formerly retail manager at the Birmingham motor truck branch, has been appointed assistant manager at the Charlotte, N. C., motor truck branch.

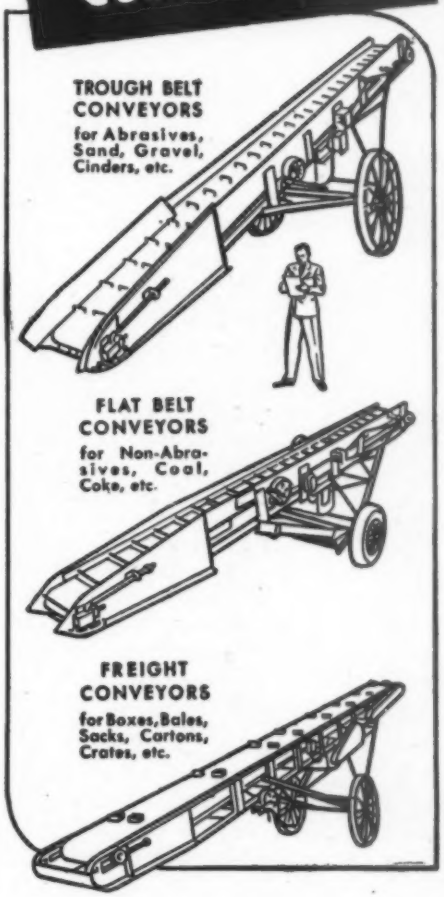
Kenneth N. Cook, assistant sales manager of the Rollway Bearing Company, Inc., Syracuse, N. Y., passed away suddenly on March 5. He had been with the Rollway Bearing Company since 1927.

Reardon Industries Incorporated announce that they now are distributors and erectors for the Owens-Corning Fiberglas Corporation's industrial insulation. A complete stock and erection service of all Fiberglas insulation is now available to the trade through Reardon Industries Incorporated, 2837 Stanton Avenue, Cincinnati, Ohio.

Conforming to its policy of sales offices in principal cities, the H. K. Porter Company, Inc. of Pittsburgh, Pa., has appointed William Lee district manager of its new Houston, Tex., sales office, located at 1045 Electric Building.

Cut down your handling costs!

TROWBRIDGE PORTABLE CONVEYORS


TROUGH BELT CONVEYORS
for Abrasives, Sand, Gravel, Cinders, etc.
FLAT BELT CONVEYORS
for Non-Abrasives, Coal, Coke, etc.
FREIGHT CONVEYORS
for Boxes, Bales, Sacks, Cartons, Crates, etc.

Figured strictly on a cost basis, TROWBRIDGE Conveyors can save you money — dollars on every ton handled — and do the job better and faster than a gang of laborers using shovels. Prompt shipment with gas or electric power. Portable conveyors have been manufactured by TROWBRIDGE for more than 25 years and are sold and serviced nationally by over 200 trained representatives. Write for descriptive literature today; no obligation.

...MAKES LIGHT WORK OF HEAVY LOADS!

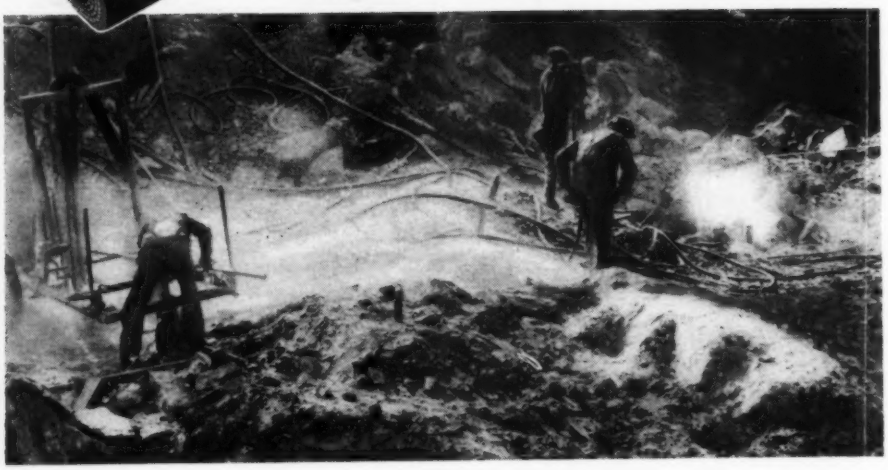
TROWBRIDGE CONVEYOR COMPANY

845 VAN HOUTEN AVE., CLIFTON, N. J.

Affiliate of MEMCO Mfrs. of Magnetic Separators

A *Tough* HOSE FOR *Rough* SERVICE!

"SUBWAY" HEAVY DUTY AIR HOSE



"Subway" has *everything it takes* to withstand the rough treatment of quarry drilling and handling. Perfectly balanced construction assures equally long life for cover, carcass and tube . . . no failure of *one* part to cause hose to be scrapped while remainder is still good. A Goodall "Standard of Quality" product, easily identified by its distinctive red cover. Sizes ½" to 1¼", lengths up to 50 feet. *Contact our nearest branch for further details.*

GOODALL RUBBER CO., INC.

THE GOODALL-WHITEHEAD COMPANIES

MILLS and EXPORT DIVISION, TRENTON, N. J.—ESTABLISHED 1870

Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • St. Paul • Los Angeles
San Francisco • Seattle • Salt Lake City • Houston • Distributors in Other Principal Cities

PULVERIZERS

Have you investigated our new BRADLEY HERCULES MILL?

Unquestionably the last word in Economy and Simplicity.

(Send for New Catalog No. 59)

BRADLEY PULVERIZER CO.

ALLENTOWN, PENNA.

W. C. MacDowell

W. J. Roberts Sr.

Photographs of W. J. Roberts Sr. and W. C. MacDowell, which unfortunately arrived too late for publication in our May issue, are here presented. Mr. Roberts was recently re-elected president of the Traylor Engineering Company, Allentown, Pa. It is his 31st term in this office. Mr. MacDowell, vice-president in charge of sales for 25 years, announced his retirement from active participation in business.

As part of a continuing service program to its conveying machinery customers, Hewitt-Robins Inc., has leased a warehouse at 1010 Pennsylvania Avenue, Charleston, W. Va., to step up deliveries in the industrial South, particularly the mining areas of Virginia, West Virginia, Kentucky, North and South Carolina.

The new warehouse will stock complete mine conveyors, screen parts, conveyor belting, idlers and other items in the Robins Conveyors Division line, ready for shipment to all parts of the South.

The Galigher Company, 545 West Eighth South Street, Salt Lake City 4, Utah, has been appointed as exclusive representative of Robins Conveyors Division, Hewitt-Robins Inc. The Galigher company's territory includes all of Utah, and parts of Idaho, Montana, Nevada and Wyoming.

Also announced by Robins was the opening of a new sales office at Kansas City, Mo. It will be headed by C. Boyd Goodhart.

Charles S. Munson, formerly president of Air Reduction Co., Inc., has been elected chairman of the executive committee. He is succeeded by John A. Hill, who becomes the fifth president of the company. William C. Keeley, formerly vice-president, was elected chairman of the newly-created finance committee. C. E. Adams remains chairman of the board of directors.

Announcement of the formal opening of a new International Harvester Company sales and service branch at 2855 Cypress Street, Oakland, Calif., was made by E. H. Watkins and L. E. Hall, the company's motor truck and general line western region managers. In addition to supplying a new and modern base of operations for the Oakland sales district (northern California, western Nevada, and Hawaii) the new Cypress Street building provides headquarters for the company's western region sales and service executives.

Appointment of two new district managers has been announced by the New Holland Manufacturing Company, Mountville, Pa., a division of the New Holland Machine Co.

A. E. Ainlay

A. E. Ainlay is in charge of the Western district, including California, Oregon, Washington, Montana, Wyoming, Utah and Colorado. Keith B. Hubbard is serving the New York state and New England territory.

Mr. Ainlay has been associated with several well known firms. From 1939 to 1947 he was retail sales manager of The Buda Company. Prior to joining New Holland, Mr. Hubbard was sales engineer in the construction equipment division of the Syracuse Supply Company.

H. Hardinge

Harlowe Hardinge, president of the Hardinge Company, Incorporated, of York, Pa., manufacturers of equipment for the mining, chemical, ceramics, sanitation, and paper industries, has been elected a director of the Pennsylvania State Chamber of Commerce for a two-year term.

The Victor J. Nelson Engineering and Construction Company has announced its removal into new offices located at 1560 Victory Boulevard, Glendale 1, Calif.

J. F. (Dutch) Hensgen of St. Louis has been appointed special mining representative for the Midwestern Division of United States Rubber Company. He will assist engineers in the selection of conveyor belting, wire and cable and other rubber products used in the mines of Kentucky, Illinois, Indiana, West Virginia, Missouri, Arkansas and other Midwestern states.

More than 40 salesmen from all parts of the country attended the annual sales meeting held by the Morse Chain Company, a Borg-Warner affiliate, in Detroit to hear F. M. Hawley, president and general manager, discuss business prospects for mechanical power transmission products.

The agenda also included an address by R. P. Johnson, vice-president and assistant general manager, on "Management's Support of Sales Objectives."

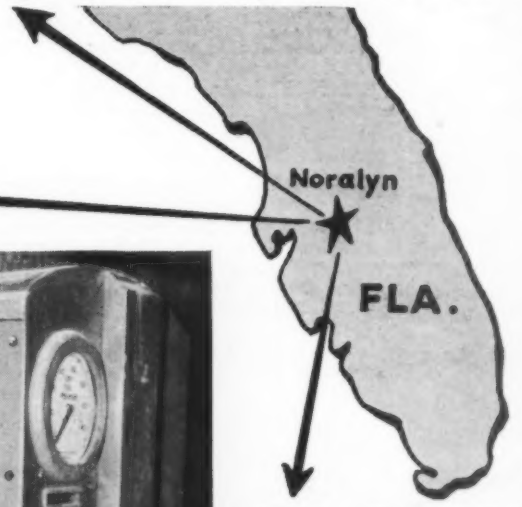
Appointment of G. W. Clements Equipment Co., Columbus, O., to a Davey dealership is announced by Davey Compressor Co., Kent, O. The new dealer will distribute all equipment of Davey manufacture including Air Chief portable compressors; Auto-Air (truck-mounted) units; Track-Air (tractor-mounted) machines; departmental (industrial) stationary compressors; mine and railcar compressors; Da-V-Lite portable lighting equipment; and the Davey Heavy Duty Power Take-off for trucks.

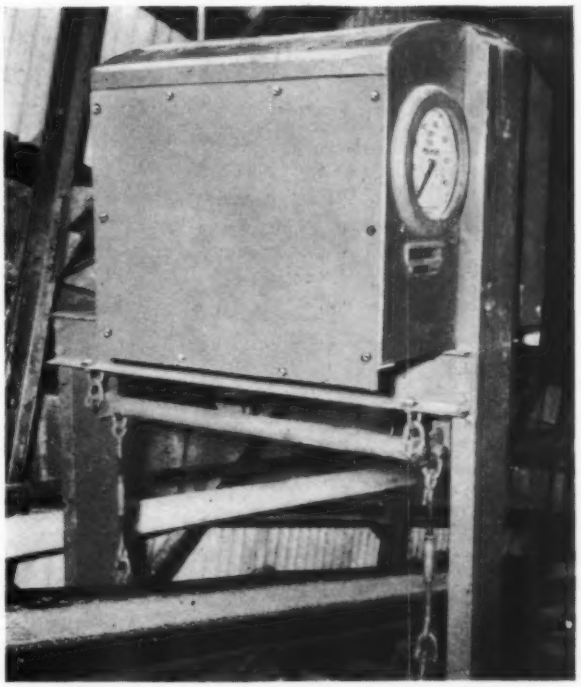
The Market Forge Company, Garvey Street, Everett 49, Massachusetts, announces the appointment of the following firms as stocking distributors: Tennessee Mill & Mine Supply Co., Knoxville, Tenn.; Bard Steel and Mill Supply Co., 251 No. Edwards St., Kalamazoo, Mich.; Miami Parts & Spring Co., Inc., 35-99 Northwest 4th St., Miami, Fla.; Bryant Machinery & Engr. Co., The Chicago Daily News Bldg., 400 W. Madison St., Chicago, Ill.

Roger W. Batchelder has been appointed assistant to the president of the National Bearing Division of American Brake Shoe Company, and William H. Old has been appointed general purchasing agent for American Brake Shoe, according to an announcement by the Company. Mr. Batchelder, formerly general purchasing agent, has been with Brake Shoe since 1933. Mr. Old, formerly assistant general purchasing agent, has served in various purchasing capacities since he first joined the company in 1940.

The World's Largest Phosphate Plant

MERRICK SCALES





ON DUTY 24 hours a day

MERRICK Weightometer on spiral feed belt provides a continuous feed record in dry tons per hour, correlating reagent consumption with tonnage. Another Weightometer records the flotation feed.

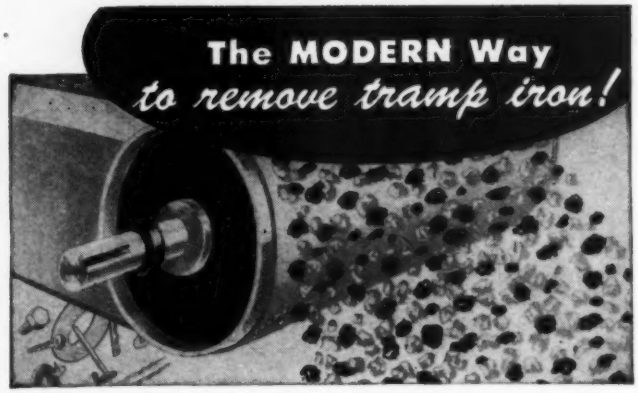
The International Minerals and Chemical Corporation's new phosphate plant at Noralyn, Florida, is unique in this field for size, efficiency, and modern equipment.

In the Noralyn plant—as in thousands of various installations—MERRICK Scales are helping to maintain maximum production by keeping an accurate and continuous record of material weights handled on belt conveyors.

This project has enormous proven reserves of high-grade pebble phosphate, and is expected to turn out 1,500,000 tons annually for the next 25 years.

Write for Bulletin No. 643

MERRICK SCALE MFG. CO., Passaic, New Jersey



NEW! Alnico Magnetic PERMA • PULLEY!

Here's the low cost, positive way to take iron out of materials carried on belt conveyors. No wiring . . . no electrical accessories . . . completely automatic . . . no maintenance or attention . . . tremendous magnetic strength. You can install it and forget it! Available in 53 sizes ready to install . . . Send for NEW BULLETIN 260-A.

(Most Powerful Non-Electric Pulley on the Market!)

PROTECTS crushers, grinders, pulverizers, stokers, other machinery.

REMOVES IRON from foods, feeds, grain, chemicals, coal, rock, ore, sand, scrap, slag, cement, sugar, etc.

DINGS MAGNETIC SEPARATOR COMPANY
4774 W. McGeogh Ave., Milwaukee 14, Wis.
50 Years' Magnetic Separator Experience!

Dings "HIGH INTENSITY"

MAGNETIC PERMANENCE GUARANTEED FOR LIFE!

EAGLE MODEL 400 LOADER

LOWER YOUR LOADING COSTS

ECONOMY moves in when an EAGLE moves dirt—or any other loose material. Because it is mobile, speedy, versatile *and* economical, it is invaluable around quarries, stock piles and road building jobs.

- **One man operation**
- **Job to job at truck speeds**
- **Hydraulic controls**

Write for detailed specifications!

Booth 3222
Road Show

EAGLE CRUSHER CO., Inc. GALION OHIO·U·S·A

JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS

Announcement of the appointment of W. K. Cox, formerly assistant general sales manager, as advertising manager of Caterpillar Tractor Co. has been made by Gail E. Spain, vice-president, coinci-

W. K. Cox

J. J. Valentine

dent with the announcement of the retirement of Gerald M. Walker, who has headed the department since 1931.

Mr. Walker's retirement terminates 33 years' association with "Caterpillar" and one of its predecessor companies, The Holt Manufacturing Company.

Succeeding Mr. Cox as assistant general sales manager is J. J. Valentine, Central Division sales manager, who has been associated with the company since 1929. He has served in general sales, purchasing, treasury and export sales departments since that time and was stationed in the Company's Washington, D. C., office several years ago. He will be succeeded by Ferd D. Haberkorn, former Sales Training Division manager.

J. W. Mohler, currently serving as assistant Central Division sales manager, will succeed Mr. Haberkorn and will in turn be replaced by Herman S. Eberling, currently a Western Division district representative.

George C. McMullen, who has been with the Tyson Bearing Corporation for 16 years, is now vice-president in charge of sales. Prior to Mr. McMullen's association with Tyson he had many years of experience in the bearing industry, during which he pioneered the installation and use of anti-friction bearings in a large number of industrial fields.

W. H. Oexle joins Tyson in the capacity of general sales manager. During the past twelve years he has been with the L. S. Starrett Company of Athol, Mass. Herschel J. Deal, vice-president, is in charge of the Midwest territory and will make his headquarters in Chicago. Mr. Deal began his career with the Tyson Bearing Corporation in 1933. Ivan C. Mann, formerly manager of replacement sales, is assistant sales manager.

R. R. Flaisig is the Tyson representative in the southern Ohio territory, making his headquarters at the factory in Massilon, O. E. M. Smith is in charge of the Northeastern territory, with headquarters in Philadelphia. Carl M. Behm is now the Tyson representative in northern Ohio.

Link-Belt Company announces the removal of its Pittsburgh district sales office to 5020 Centre Ave., Pittsburgh 13. The Pittsburgh office is headed by Otto W. Werner, district sales manager.

legal decisions

By LEO T. PARKER

A few days ago a reader wrote in part, as follows: "We are in the business of selling sand and gravel in Ohio. An automobile dealer in Indiana sold a motor truck to a man named Wilson on time. Wilson drove the truck into Ohio and sold it to us. Can the automobile dealer get possession of this truck and if not, are we liable for the amount due on the truck?"

First, for the benefit of all readers, we shall state that all modern higher courts consistently hold that the "record" of a chattel mortgage in the *town or county* where it is required *by law* to be filed, constitutes *constructive notice* to all the world, and the mortgage is valid even though not refiled in the town or county to which the truck is later removed.

See the late and leading higher court case of *Mossler Acceptance Corporation v. Naquin,* 30 So. (2d) 766. Here a chattel mortgage on a motor truck was executed and the note signed by a purchaser named Frank, who resided in the city of New Orleans, La. The mortgage was recorded in the mortgage records of the county of Orleans. Three months later Frank sold the truck to William A. Richardson, who shortly afterwards sold it to the West Bank Motors, which later sold the truck to Peter Naquin in Terrebonne County.

Mossler Acceptance Corporation sued Peter Naquin to recover possession of the truck. Both Naquin and the West Bank Motors contended that the seller could not recover possession of the truck because the mortgage was not recorded in the county or state where the truck was last sold. Nevertheless the higher court awarded the seller custody of the truck and said:

"Naquin avers that at the time he bought the car he had no knowledge of any outstanding mortgage bearing on it and, on information, alleges that none existed. . . . Filing and recordation of chattel mortgage in a county of chattel's location and that of mortgagor's domicile gives mortgage effect in all other counties."

Hence, if a chattel mortgage on a truck or other equipment is recorded in a county in any state, the holder of the mortgage can take possession of the truck at any time from any person in any state who is unlawfully in possession of the truck.

Must Rehire Veteran

The Selective Training and Service Act of 1940, (Section 8, 50 U.S.C.A.) provides that employers *must* reinstate discharged veterans to the *same* position held when inducted into the military service.

In *Van v. Van and Service, Inc.,* 162 Fed. (2d) 1007, the testimony showed facts, as follows: On being discharged in 1944 from military service an employee applied for reinstatement to his position he had in 1942 at which time he was a foreman in a plant.

The higher court held that the corporation must reinstate the employee to his original position and, further, the corporation must pay the employee damages for delay in reinstating him, if the testimony shows that the delay was not caused by the employee's negligence in waiting too long in filing suit to compel reinstatement.

Void Contract

Under no circumstances may municipal officials make contracts or issue permits *outside the scope* of a city zoning ordinance where the ordinance clearly defines the kinds of businesses allowable in a designated locality.

For illustration, in *Lynch v. Borough of Hillsdale,* 54 Atl. (2d) 723, it was shown that a company had for many years operated a plant. Homes were from time to time built in the vicinity of the plant and around it. Then the city passed an ordinance prohibiting any industrial plants or business in this vicinity.

Since the company's plant was in operation *before* passage of the ordinance, the higher court held that it was *not* affected by the new ordinance. Also, this court held that city officials could not make a valid contract giving the company the right to operate a different kind of business in this locality.

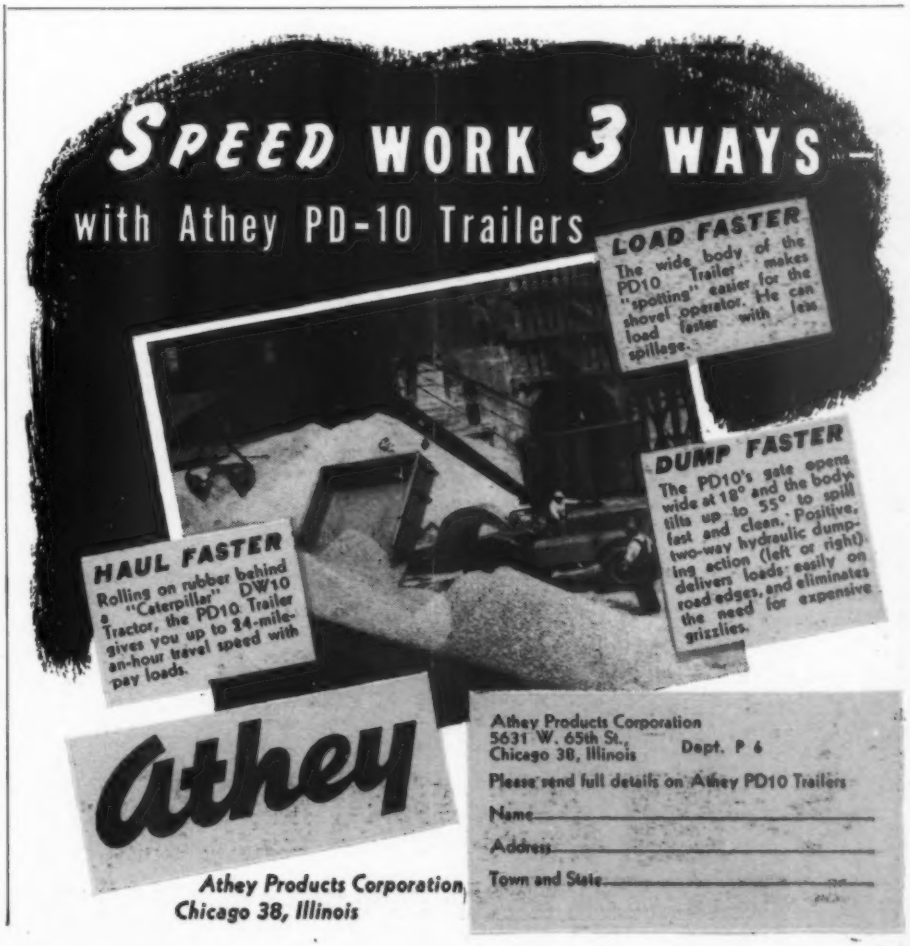
Full Damages

According to a recent higher court a seller who breaches a guarantee on used machinery for digging sand, gravel and other materials is liable to the seller for *all* damages sustained.

For illustration, in *Gill v. Skinker,* 45 S. E. (2d) 818, it was shown that a seller of used machinery for digging nonmetallic products guaranteed that it was reconditioned and in perfect shape, that the same was reasonably suited to the use intended, and had no latent defects.

The purchaser discovered after a trial that the machinery was defective, needed repairs and had not been completely reconditioned.

The purchaser lost the use of the machine from March 31 to July 13, and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sued to recover the rental value which amounts to $4,205.83; also, the purchaser proved that while the machine was being repaired he was forced to rent another similar machine at a cost to him of $1,225 per month and was required to pay the shipping charges on same amounting to $450. The higher court awarded the purchaser *all these* damages.

Automobile Hits Rock

According to a recent higher court it is not unlawful nor negligence to obstruct a public highway with a pile of rock, if the highway is *not open* for traffic.

In *Pittman v. Sather,* 188 Pac. (2d) 600, it was shown that a contractor had a contract to repair a four-lane highway. He left on the highway a pile of crushed rock dumped there by a truck which hauled it from a quarry.

Three occupants of an automobile sued the contractor for damages for injuries to their persons and motor vehicle received from a night-time collision with the stock pile of crushed rock, left on the four-lane highway which had been constructed but *not then* completed nor opened for public travel. In refusing to hold the contractor liable, the higher court said:

"The primary duty of the contractors here was to give proper warning to prevent the public from getting on and traveling the road."

For comparison, see *Osier v. Consumers Company,* 248 P. 438. This court laid down law that it is the duty of a contractor on a public highway *open to traffic* to place signs warning the public of an obstruction or barrier or depression or that other dangerous condition exists. During darkness, the sign or warning must be visible to an ordinary prudent person approaching that danger spot. Such a sign or warning must be such a distance from the danger spot as to give a *reasonably prudent* automobile driver on the highway ample advance notice of the existence of such a danger.

Also, see *Maier v. Minidoka County Motor Company,* 105 P. (2d) 1076. This court said:

"Generally it is negligence as a matter of law, or at least strong evidence of negligence, for a motorist to operate his automobile on a highway at such a speed that the automobile cannot be stopped within the distance within which objects can be seen ahead of the automobile."

Salesman Is Killed

It is well known that an employee can recover compensation for an injury sustained "within the scope of the employment." Considerable discussion has arisen from time to time over the legal question: Is a salesman within the scope of his employment when going home from a place of amusement?

In *Brown v. Weber Implement and Auto Company,* 206 S. W. (2d) 350, the testimony showed facts, as follows: One Saturday night a customer phoned a salesman named Brown and told him that he wanted to talk to him about buying some materials and requested him to come up to the Chain Yacht Club that night. Brown met the customer at this club and remained dancing and drinking until the club closed about 1:30 a. m. When going home Sunday morning, the automobile in which Brown was riding collided with a telephone pole. Brown died as a result of injuries received in the collision.

In subsequent litigation the higher court held that Brown's dependents could receive payment of compensation stating that Brown was injured and died by reason of an accident "arising out of and in course of employment."

Gravel Kills Boy

All courts agree that employers owe a greater degree of care to protect children from injuries than is owed adults. However, no employer *is expected* by law to exercise more than "ordinary" care to safeguard either children or adults from injuries.

For example, in *Teagarden v. Russell,* 207 S. W. (2d) 18, the testimony showed facts, as follows: A contractor was engaged in unloading gravel from a gondola railway for highway construction. The cars were placed over a pit and when the hoppers were opened the gravel fell upon a conveyor belt which was supported by a steel structure and was operated by a gasoline motor. Trucks were driven under the conveyor belt and the gravel was dumped into them. While the first truck of the day was being unloaded the operator of the machinery saw a shoe come through the bottom of the railway

What every Producer OUGHT TO KNOW about MODERN WEIGHING METHODS

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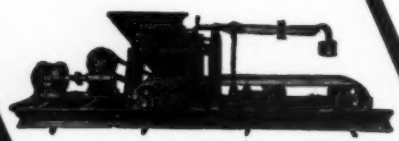

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car. The motor was immediately cut off and the body of a boy which was in an upright position, was removed from the gravel. Apparently he was sucked to the bottom of the car when the hopper was first opened and died of suffocation.

The boy's mother sued the contractor for damages. The higher court refused to hold the contractor liable, saying that it was not the duty of the operator to ascertain whether or not any children were in or upon the car before he opened the hoppers and started the conveyor belt in motion.

Didn't Read Contract

All higher courts agreed that if a person "neglects" to read a contract he *cannot* be relieved from fulfilling the assumed obligations. However, if the person who signed the contract was *deceived,* or could not read, he may rescind the contract.

For example, in *Dunham v. Hogan,* 56 Atl. (2d) 550, it was shown that a man named Hogan and two others were looking for gravel pits adjacent to the new turnpike road, with the idea of purchasing them and selling them to the Maine Turnpike Authority. They got in touch with the owner of such a pit and after some hours of negotiating entered into a written contract with him.

In this contract the land owner agreed to sell his farm for $3,500.

Later the land owner refused to sell his farm, saying that he did not read the contract and thought that part of the farm, about eight acres, containing the gravel pit was *not* to be sold. He testified that in school he did not get into the fourth reader and could only read the headlines and pictures of a newspaper.

Also, two disinterested witnesses testified that about two weeks before the farm owner signed the contract they made a survey of the gravel pit, and they told him that he could get at least $6,000 and probably $12,000 for gravel on the farm.

In view of this testimony the higher court refused to compel the farm owner to sell his farm for $3,500, saying:

"It seems incredible that he (Hogan) knowingly would have agreed to convey for $3,500 the farm a part of which was the gravel pit in which was gravel worth a minimum of $6,000 and probably $12,000, when he could have sold the gravel and still retained his farm. There is no explanation other than that he made a mistake, he did not realize what he was signing."

Strong Interest Reported In 18th Annual Power Show

Announcement has been made that the 18th National Exposition of Power and Mechanical Engineering will be held in Grand Central Palace, New York, from November 29 to December 4, during the week of the annual meeting of the American Society of Mechanical Engineers. It is reported that advance reservations of space have been heavy, indicating an exceptionally strong interest on the part of exhibitors. I. E. Moultrop is chairman of the advisory committee of the exposition.

traffic news

CENTRAL FREIGHT ASSOCIATION

Docket 85054 (2)—It is proposed to establish on limestone, fluxing, crude (foundry and furnace) in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car or actual weight, from Hillsville, Pa., to Erie, Pa., 99 cents per gross ton.

Docket 85057 (2)—Proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds, following rates in cents per net ton:

To	From Branchton-Osbornes, Pa.	Conneaut, O.
Arcadia, Pa.	187	215
Brave, Pa.	...	226
Dilltown, Pa.	165	204
Glen Campbell, Pa.	187	215
Hellwood and Lamar, Pa.	193	215
Vintondale, Pa. ...	165	204

Docket 85058 (2)—Establish on slag, expanded (construction material aggregate), carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply (but not less than 80,000 pounds) from Buffalo, N. Y., to Detroit, Mich., 182 cents; Milan, Mich., 193 cents net ton.

Docket 85208 (2)—Proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds, from Woodville, Ohio to Zanesville, Ohio, 182 cents per net ton.

Docket 85210 (2)—It is proposed to establish on stone, crushed, in bulk, in open top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Spencer, Ind., to Switz City, Ind., 52; Worthington, Ind., 50 cents, net ton.

ILLINOIS FREIGHT ASSOCIATION DOCKET

Docket IRC 511-635—Stone, crushed, carload minimum weight 90 percent of marked capacity of car, but not less than

The New AMERICAN "ACS" Offers a Great Advance in Heavy Duty Crushing...

American ACS features sturdy sectional construction, dust-tight machined joints. All crushing parts of extra heavy manganese steel.

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- 4.4% passing 2½" screen retained on 1½" screen.
- 13.2% passing 1½" screen retained on 1 " screen.
- 18.7% passing 1 " screen retained on ¾" screen.
- 19.8% passing ¾" screen retained on ½" screen.
- 16.5% passing ½" screen retained on ¼" screen.
- 13.2% passing ¼" screen retained on ⅛" screen.
- 14.2% passing ⅛ screen.

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"KEEPS PROMISES"

40,000 pounds, from Krause, Ill., to Sesser, Ill. Present: 131 cents net ton. Proposed: 114 cents net ton. Rates subject to X-166 increase.

Docket IRC 511-688—Stone, broken or crushed, minimum weight 90 percent of marked capacity of car, but not less than 40,000 pounds, will apply, from Fulton, Ill., to the following points:

	Present	Proposed
Galesburg, Ill.	220	110
Monmouth, Ill.	240	110
Canton, Ill.	260	121
Avon, Ill.	240	121
Lewiston, Ill.	280	132
Fairview, Ill.	260	132

All rates subject to X-162-A and X-166 increases.

PACIFIC FREIGHT TARIFF BUREAU PROPOSALS

Docket L-2530—(Shipper) Common lime, carload, request for rates in cents per hundredweight from Chubbuck, Calif., to the following points in Arizona:

Tucson	34 cents
Casa Grande and Eloy	31 cents
Tempe, Mesa, Chandler, Coolidge and Buckeye	30 cents

The above are not subject to Tariff X-162-A. Minimum weight 60,000 pounds.

DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION SUBMITTALS

Docket 39552(c)—Establish a rate of $3.49 per ton of 2,000 pounds on silica sand, ground or pulverized, carload minimum weight 90 percent of marked capacity of car, from Ottawa, Ill., to Memphis, Tenn.

Docket 39619 (a)—Establish rates on agricultural limestone (carload) to points in Kentucky and also cancel present basic rate of 66 cents per ton 2000 pounds from Hopkinsville to Jago, Ky., and from Latham to Jago and Manitou, Ky., allowing T-295 scale to apply.

SOUTHWESTERN FREIGHT BUREAU

Docket 44548 (2)—It is proposed to establish a rate on limestone, ground or pulverized from Marble City, Okla., to Denver, Colo., of $4.15 per ton 2000 pounds, in bulk, in bags or in barrels, carloads, minimum weight marked capacity of car, except that actual weight will govern when car is loaded to full visible capacity.

Docket 44586 (1)—Establish rates on lime, common, carload from Limedale Spur, Ark., to Kimberly, Wis., 31 cents; Niagara, Wis., 34 cents, minimum 30,000 pounds.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket E-41-947—Proposed to establish a rate of 132 cents per net ton on agricultural limestone, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full visible capacity, actual weight will apply, but in no case less than 40,000 pounds from Green Bay, Wis., to Duluth, Minn.

Docket E-41-952—Crushed stone and crushed granite, agricultural limestone (not ground or pulverized), in bulk, in open-top cars, minimum weight 90 percent of marked capacity of car, except when loaded to full visible capacity, in which case actual weight will govern, but not less than 40,000 pounds, from Ablemans and Red Granite, Wis., to Natrium, W. Va. Proposed—$4.66 per net ton.

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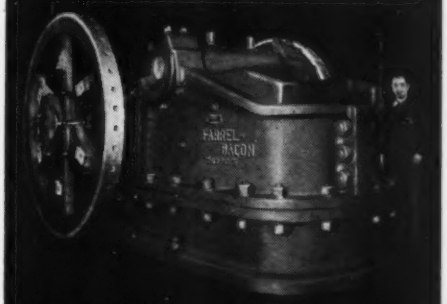
Write for further details or engineering help. BA-1



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NEWS OF CONCRETE MANUFACTURERS

First Annual Meeting of Missouri Products Men Held at Springfield

Springfield, Mo., was the setting for the first annual meeting of the Ozark Empire Concrete Products Manufacturers, held on April 10 at the Colonial Hotel.

Speakers included Russell Hennis of the F. C. George Machine Co., Orlando, Fla., and A. C. Weber, director of research and sales engineering for the Laclede Steel Company of St. Louis.

The association's membership includes manufacturers and dealers within a radius of 150 miles of Springfield. George Rhodius of Springfield is president and Stewart E. Tatum, Joplin, is vice-president.

F. J. Cain Jr. to Direct Sales For Carolina Giant Cement Co.

Frank J. Cain Jr. was recently appointed sales manager for the Carolina Giant Cement Company. He has been for the last eight years North Carolina representative for the firm, maintaining headquarters in Raleigh. In his new position, Mr. Cain will supervise sales for Giant throughout the Carolinas, Georgia and Florida. His office will be in Columbia, S. C.

At Harleyville, S. C., conversion of the former government-owned alumina plant into a cement plant is being carried out by the Carolina Giant Company, which recently acquired the facilities. Shipment of cement is expected to begin in October. There is at present no cement production in either of the Carolinas; but the annual output will be about 800,000 barrels when Giant gets into production.

Frank J. Cain Jr.

N. R. M. C. Assn. Yearbook Available to All Producers

Continuing the custom established last year, the National Ready Mixed Concrete Association, 1325 E Street, N.W., Washington 4, D.C., has issued its 1948 yearbook. A copy has been sent to all member producers, and non-member producers are invited to write in for their copies.

The book contains a list of association officers and members of the board of directors, as well as a list of active and associate members, with addresses. The yearbook also carries a brief account of the work of the association since its organization more than 18 years ago.

Michigan Block Concern Host To Dealers at Dinner-Meeting

More than 75 Michigan concrete block men were recently entertained at a dinner by officials of the Little Rock Lumber & Coal Company of Alma, Mich., operators of a modern block plant in that city.

A major feature of the entertainment was the showing of a film on modern block construction by H. Paulson of the Besser Manufacturing Company of Alpena, Mich. Guests discussed their problems and the modern use of cinder and concrete block during the round table session.

Charles Brown, operator of the Hutchinson Supply Company of Hutchinson, Kan., has announced that work has begun on the firm's $20,000 expansion program, which is expected to make its facilities the largest ready-mix plant in the state.

Coming Events

June 21-25, 1948—Detroit. Annual meeting, American Society for Testing Materials.

July 16-24, 1948—Chicago. Convention and Road Show, American Road Builders Association, Soldiers Field.

September 20, 1948 — Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor. Soldier Field.

Smithwick Announces New Insul-Lite Agency and Plant At Roseburg, Ore.

Walter S. Mallory of the Roseburg Concrete Products Company, Roseburg, Ore., was recently named local agent for the Insul-Lite Block & Supply Company, according to an announcement made by S. C. Smithwick, president of Insul-Lite. Mr. Mallory will handle the Insul-Lite line of pumice-concrete block and allied products, and will continue the manufacture of standard concrete block.

At Eugene, Ore., Insul-Lite is building a plant in which production of pumice units is expected to reach 6,000 per day by the middle of May.

In addition to his duties as president of Insul-Lite, Mr. Smithwick is also head of Smithwick Concrete Products Company, Portland. The Eugene plant is owned by the Smithwick Company and the Empire Building Material Company, also of Portland.

Plans for '49 N.C.M.A. Show Forecast Impressive Display

Plans are being completed for the 1949 Concrete Industries Exposition, sponsored by the National Concrete Masonry Association, which will be held in the Cleveland Auditorium from January 31 to February 3, 1949. N.C.M.A. convention sessions will also be held in the Auditorium.

It is estimated that 28,000 square feet of floor space will be needed for the exhibits; and additional space has been reserved for any necessary expansion. Exhibitors may show and operate even the largest types of concrete products machinery at the exposition.

Wyoming Block Concern Erects Building Center in Cheyenne

The Powers Builders Supply Company of Cheyenne, Wyo., recently completed a structure known as the Cheyenne Building Center, in which various dealers in building lines have leased space.

The firm, operated by Jim and Tom Powers, has also installed new equipment and initiated improved methods in its recently enlarged block plant. The proprietors have announced their intention to produce cinder block in all modular sizes.

N. T. Rykken, formerly a field and structural engineer with the Portland Cement Association, is now associated with E. K. Brown in the management of Whitney's ready-mixed concrete producers of Duluth, Minn. The announcement was made by Mr. Brown, who is general manager of the firm.

50,000 Two-Unit Quarters Costing $75,750,000 Planned For Indian Mine Workers

Something is going to be done about the housing problem—in India, where the government is considering the erection of 30,000 miners' quarters consisting of two-family units outside the coal field areas and 20,000 more of equal size directly over the pits.

In addition to these projects, the Indian government proposes to build for the Coal Miners' Welfare Works at Serai Dhela, Dhanbad, 10 or 15 central hospitals, regional hospitals, anti-malaria buildings and staff quarters. This vast program will cost an estimated 25 crores of rupees ($75,750,000) and will require approximately 400,000,000 blocks, 8 by 8 by 16 inches in size, over a period of about five years.

Officials of the Western Manufacturing Company in Bombay, agents for the F. C. George Machine Company of Orlando, Fla., have estimated that in order to carry out such a project more than 100 George block machines would be needed, all operating at full capacity. The Indian firm has prepared a booklet describing the equipment contained in the George block plant, together with an explanation of the Press Pac principle. Views of the various pieces of equipment and action shots of the block machine were furnished by the F. C. George Company.

• A Canadian concern, S. McCord & Company, Ltd., 611 King Street E., Toronto, Ont., Canada, uses a "Caterpillar" diesel-powered P & H clamshell with a 60-ft. boom to handle aggregate and load hoppers at its ready-mixed concrete plant in North Toronto.

Spectacular Expansion Noted In S. California C. M. Assn.

A 500-percent increase in membership since January 1, 1948, was revealed by Clif Hendrickson, secretary-manager of the Concrete Masonry Manufacturers' Assn. of Southern California, at the monthly dinner meeting of the organization, held April 27 at the Eleda Restaurant in Los Angeles.

At the beginning of the year the association had 13 producer members and no associate members (suppliers of equipment and materials, architects, engineers, etc.). At the April meeting it was announced that 57 concrete-products operators are now full-fledged members. There are also 15 associate members. Average attendance at the monthly meetings this year has been 65, including guests.

It was also revealed that, since the first of this year, 38 city and county building and safety departments throughout southern California have expressed their approval of the association-sponsored Triplett & Barton block tests in lieu of all other tests and reports. Savings to members who would otherwise be forced to conduct individual tests at frequent intervals will total thousands of dollars.

Universal Adds Small-Size Pipe To Line of Concrete Products

The Universal Concrete Pipe Company has announced the addition of small-size sanitary sewer pipe to its line of products, according to L. E. Barrett, sales representative at Rochester, N. Y. The small pipe is made on a spinner-type machine.

"Previously we concentrated on large reinforced concrete pipe that ranged up to 72 inches in diameter," stated Mr. Barrett. "In addition to the larger size of pipe, we will now produce the small pipe that can be used in sanitary sewer laterals and similar projects."

Universal, which has been in the concrete pipe business for the last 27 years, also has added concrete block to its Rochester plant's line.

Professor and Producers Collaborate on Pipe Tests

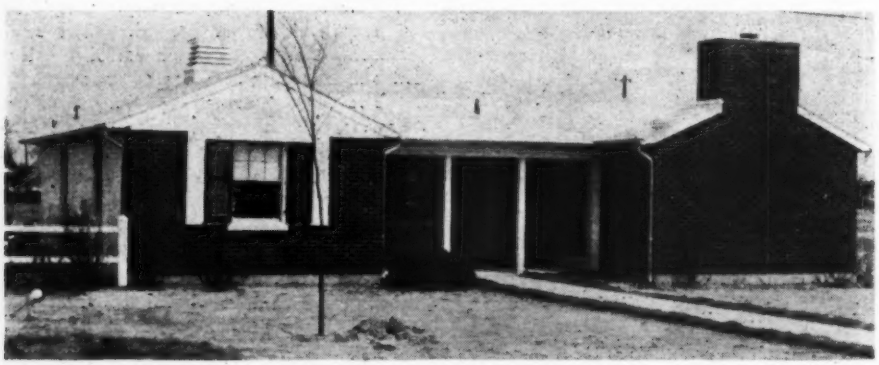
Investigations of the properties of concrete irrigation pipe, designed to indicate the best mix for such pipe, are being made this spring on the Los Angeles campus of the University of California by Arthur F. Pillsbury, associate professor of irrigation.

Sections of specially fabricated pipe, ranging from a very low to high cement content, were contributed to the project by the Concrete Conduit Company of Colton, Calif.

The project is an attempt to verify the opinion that low cement content pipe, because of its plastic flow properties, will not develop high stress.

Facilities of the Choate Supply Company at Rogers, Ark., have been sold by the previous owner, J. E. Choate, to E. C. Randolph of Chicago. Production of concrete block and drain tile will continue under the temporary supervision of Mr. Choate.

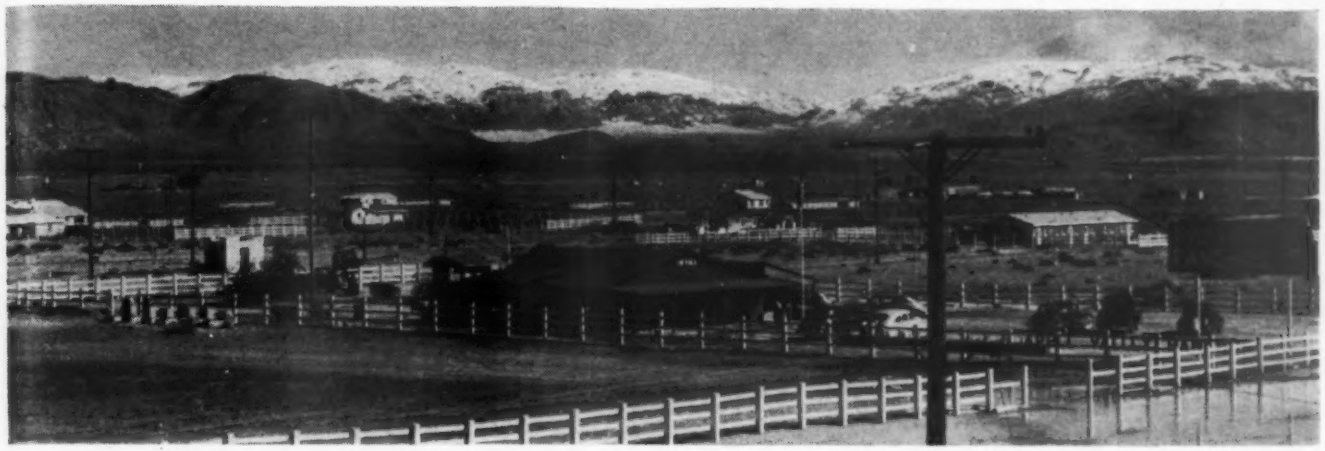
After 33 years of service with the Lehigh Portland Cement Company, T. L. Hughes, Western sales manager for the firm, retired from his duties on May. 1. He will be succeeded by F. V. Clicquennoi, formerly district manager of the company's Birmingham office.



• Chances on this six-room model home, completely furnished, were distributed among 500,000 visitors at the Home Show of the Louisville Association of Home Builders held from April 2 to 12 in that Ohio River city. The $30,000 house was of Celocrete lightweight concrete block construction, faced with brick. Warrall Bros. (Louisville and St. Matthews, Ky.) supplied the blocks.

Desert Community Boom Provides Ideal Concrete Products Market

By HARRY F. UTLEY



• A part of the Apple Valley Rancho development, with snow-capped range in the distance.

another ON THE SPOT report

ON the fringe of California's Mojave Desert, less than 100 miles from Los Angeles lies Apple Valley. Here the Mojave River goes underground and disappears, and in so doing allows the life blood of the desert—water in ample quantities—to become available by the relatively simple expedient of drilling downward two or three hundred feet into the natural reservoir.

Envisioning another desert resort similar to famed Palm Springs, a group of California millionaire oilmen have acquired thousands of acres in Apple Valley to create "Apple Valley Ranchos" and have launched a large construction program. The accent is on fireproof, rancho-style homes and commercial structures; and these buildings are, for the most part, of concrete-masonry construction with concrete-tile roofs.

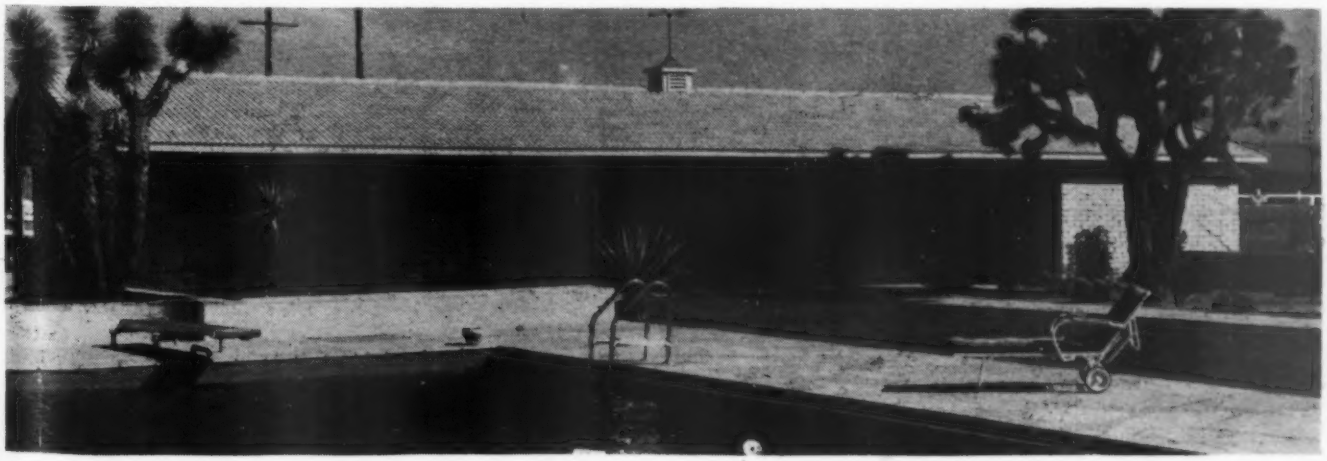
These concrete products are being supplied in large part locally by the Apple Valley Supply Co., a new concern formed by Paul Parish, J. B. Hudson, Philip Johnson, and Roy Ford. Visiting the site a few months ago, they saw the big demand already created by block and roofing tile which were at that time being trucked in from long distances away. Their new plant began operating on February 1, 1948, and has been in full production ever since.

• Left: Operators busy at three tile machines. Note the freshly-made units being carried away by the off-bearing belt conveyor.

• Below: A typical Apple Valley rancho, showing the use of concrete masonry and concrete roofing tile.

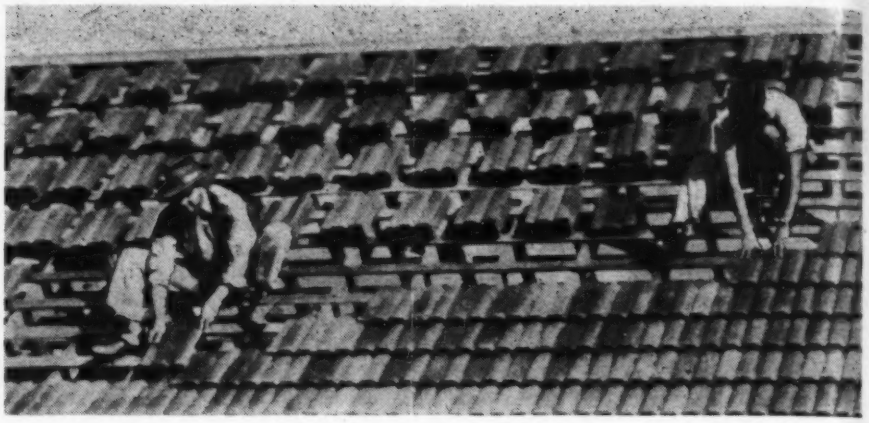
Masonry units are produced in the popular "California size", in 4-in. heights, using pumice aggregate. Laid up with unstruck mortar joints, they are admirably suited to the ranch-type of architecture to which all Apple Valley structures are restricted. A Flam No. 3 machine is initially being used to mold the units but this equipment does not have sufficient capacity to meet the demand and the company plans to install a high-capacity automatic machine in the very near future. An 18-cu. ft. Williams batch mixer supplies the concrete to the block machine.

The low-sloping roofs of the hundred-odd rancho homes already built are particularly adapted to the concrete tile roofs that are universally employed in the development. These are the popular, streamlined



Bartile which are produced at the Apple Valley Supply Co. plant in a wide variety of colors. Besides its aesthetic appeal, Bartile is fireproof and stormproof and is quickly and economically applied. The tiles interlock tightly to form a permanent roof without requiring nails or mortar in their application.

The company is presently using three Bartile machines to produce the roofing tiles. Originally these were set up as separate production units and the output ran about seven squares (1,050 units) per 8-hr. day. By installing an off-bearing belt conveyor and grouping the machines at the end and at each side of the conveyor, production was speeded up to ten squares per day. More machines can be installed along the belt and probably will as the demand increases. As each roofing tile is struck off, it is given a finishing "slick" on its exposed surface by a fog spray of water. each machine having been equipped with a water tank and spray nozzle. Concrete used in Bartile production is prepared in a revolving mixer, using plastic portland cement and sharp sand in 1:2 proportions. It yields a high-strength mortar insuring a durable unit with high resistance to breakage and a low factor of absorption. An operator loads the palleted tile on the special racks as they come off the end of the conveyor and the rackloads are allowed to remain inside the building overnight for the initial cure. The next morning they are moved into the yard, stripped from the pallets and alowed to cure in stacks for two or three weeks before they are shipped for application. A Northridge gasoline-powered lift truck handles the racks to and from the yard. Pallets are re-oiled each time before using, being immersed in a concrete tank below ground level which contains a light grade of fuel oil. The company sells the Bartile roofs installed and has an outside crew constantly busy doing application work.



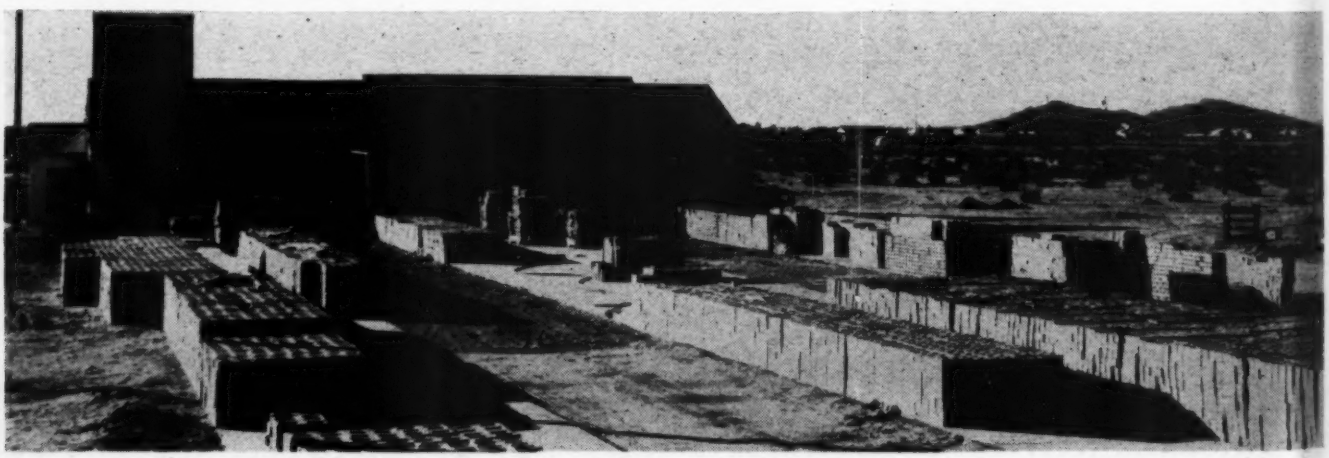
• Applying the tile roofing is a simple matter. Note how the tiles are piled for convenience of the applicators.

Aggregates—pumice and sand—are brought in by dump truck and discharged at the plant into a 2-compartment concrete receiving hopper located below ground. A bucket elevator carries them up to the storage bins which supply the mixers. The plant floor and all yard runways are paved with concrete.

The masonry units are produced in the regulation light gray color of pumice concrete only but, after being laid up in the wall, are usually painted in colors to suit the whim of the individual owner. The Bartile roofing, of course, is permanently colored at the time of manufacture and needs no further treat-

(*Continued on page* 136)

• Right: A view of the concrete-block production end of the Apple Valley Supply Company's plant. Palleted units on skids are handled by the small power-driven lift truck shown at the left.
• Below: The new plant and storage yard of the Apple Valley Supply Company.



Foresight in Building Cinder Stockpile Proving Valuable Hunch at Duro-Crete

another ON THE SPOT report

THE Duro-Crete Co., located in East Providence, R. I., might advertise, without too much fear of contradiction, that they have one of the country's larger stockpiles of cinders. The foresight that placed quantities of cinders on company property is being repaid by uninterrupted operation of the plant while other block makers in the vicinity are scratching for this hard-to-find material. Cinders, brought to the plant both by rail and by truck, are dumped into either of two hoppers, one located under tracks and the other at ground level. Each hopper is covered with a 4-in. bar-and-rod grizzly, which is kept from clogging through the use of a Syntron electric vibrator. The grizzlies serve to keep a certain amount of the larger pieces of foreign material, found in all cinders, out of the plant. When the hoppers are full, incoming cinders are taken by trucks and dumped onto the huge stockpiles along each side of the plant.

• A general view of the Duro-Crete plant at East Providence, R. I., seen from the top of the pile of cinder aggregate which extends along the two sides of the plant.

From the bottom of the hoppers, the cinders fall onto a short belt conveyor with a Dings magnetic head pulley which removes tramp iron from the material. The conveyor, in turn, feeds into a Butler bucket elevator which carries the material to the top of the plant for screening over a Universal 2-deck vibrating screen. Cinders passing either deck of this screen are binned separately in the two-compartment Butler bin, while material not passing the top deck is directed over a Menco magnetic separator and then chuted down to a New England jaw crusher. After discharge from this unit the flow passes through a Bonded Scale roll crusher. The roll crusher product drops directly into the boot of the original hopper-fed Butler elevator, completing the closed-circuit layout.

The bins fed by the screen are completely enclosed within the tower of the main plant building. Sized cinders are drawn from the bottom of the bins into a Butler 5-ton weighing batcher, where they are proportioned with the correct amount of high-early-strength cement. Water is added, and the whole batch is dropped into a 50-cu. ft. Besser mixer, to be thoroughly mixed.

• Left to right: Frank Altieri, plant superintendent; Miss Dina Cola, stenographer; Dr. E. Addonizio, president.

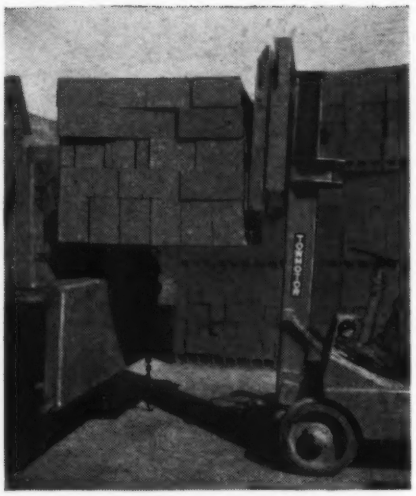
Lehigh, Keystone and Nazareth high-early-strength cements are used, and all cement is delivered by rail in bulk, coming into the plant through an under-track screw conveyor. The screw discharges into the base of a completely-enclosed Butler bucket elevator, and is carried aloft to a cement bin which is completely within the main tower structure, as are the aggregate bins, and thus protected from the elements.

Sand and pea gravel are also delivered by rail, for these aggregates are utilized in making heavyweight concrete block in the Duro-Crete plant. These materials are stored in an outside hopper at the rear of the plant. They are batched into the mixer in exactly the same manner as are the cinders.

The units are molded by a Besser Super Vibrapac block machine. Racks of blocks (or brick) are placed in one of the seven curing chambers, which measure 8- by 10- by 75-ft., holding two racks abreast. Doors at either end of the kilns facilitate the placement and removal of racks by an Erickson platform lift-truck. The sides of the curing rooms are of poured concrete, while the roof of each room is made up of three layers of Celotex insulation, covered with a layer of cinder aggregate.

The curing cycle varies with the seasons, but as a rule the blocks are in the curing chambers overnight. Steam, at 170-180 deg. F., is admitted for three hours of this period, and dry heat from Vulcan fin-type radiators is applied for lengths of time which vary with the seasons. In summer heat is introduced for only a few hours; in the winter it is kept on for most of the night. These fin-type radiators are relatively new in the concrete products field, although they have been widely used for the heating of homes. According to Frank Altieri, plant superintendent, the new type radiator is highly efficient, and has resulted in a considerable reduction in fuel costs. The steam is supplied by a Bigelow (New Haven, Conn.) boiler with a Ray oil burner.

Racks are removed from the curing chambers by lift-trucks and taken to the paved "cubing-yard" immediately in front of the kilns. While one side of the high-ceilinged area is open, the roof and three sides afford good protection to the men who remove blocks from the racks. The units are stacked in cubes so that the fork trucks may pick up blocks without benefit of pallets. Bricks are stacked upon wooden pallets, which permits the use of "layer storage" for this product as well as for the blocks. Cubes of brick and block are stacked three and four tiers high in the yard at the front of the plant. When an order is to be loaded out, the Towmotor lift-truck picks up the cubes of blocks that have been longest in the yard and places them onto the trucks.



• A lift truck elevates a cube of cured blocks from storage and loads them out on a company truck.

The company maintains several trucks for the hauling work around the plant. An Autocar and a Dodge dump truck are used for stockpiling cinders, working in conjunction with a ½-cu. yd. Unit crane. While these dump trucks are also used on occasion for hauling products, the bulk of this work falls on two Fruehauf trailers, 24 and 28 feet in length, which are drawn by Mack tractors.

A number of mixes are used in the production of the company's various products. Several sizes of block are produced with cinder aggregate and the same sizes are also made with sand and gravel. Some experimental units have been made utilizing Waylite lightweight aggregate, with satisfactory results.

A substantial amount of the production is given over to "Duroble" brick, an 80-percent-cinder, 20-percent-sand brick, maketed under this special trade name. This is a nailable unit and, according to the company, it meets A.S.T.M. and grade A brick specifications. The bricks are available in gray, red, brown, and special colors to order. For other uses a 90-percent-sand, 10-percent-cinder brick is available. Lintels are also made from the cinder aggregate. The plant began operating in the spring of 1947.

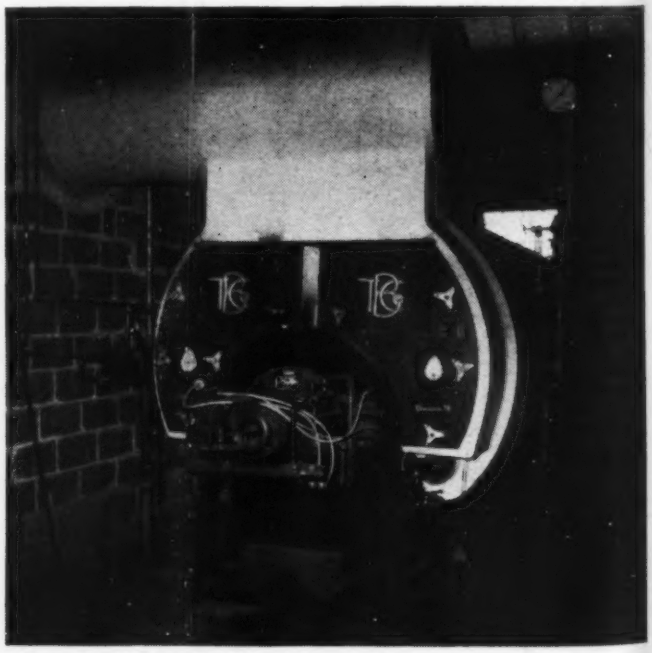
Desert Community

(*From page* 134.)

ment, as fade-proof mineral oxides are employed in the mix. The Apple Valley plant turns them out in red, yellow, blue, green and Spanish white but finds that red is the most popular, used in combination with masonry walls painted white. Roofs in white are next in popularity because of its ability to reflect the heat of the desert sun.

Considerable national publicity has already been accorded Apple Valley Ranchos through story and picture in the pages of *Look* and *Holiday* magazines. One-acre "estates" are selling for around $2,-350 and the promoters have reportedly sold 2,000 acres so far with volume currently running about $250,-000 monthly. Buildings are rising rapidly. To exploit the project and conduct prospective buyers around the property in station wagons, the promoters have a staff of 52 working out of the headquarters office building, all togged out in colorful cowpuncher gear!

• The grizzly on the truck hopper, with vibrator. Bucket elevator at right.



• The boiler, with oil burner, which supplies steam and dry heat to the curing room.

Maintenance Pays Off At Elmhurst

Company Finds Keeping Up Appearance Is No Extravagance

another ON THE SPOT report

By EDWARD BRUNENKANT

THE Elmhurst-Chicago Stone Company's crushed stone and concrete block plants are located well within the city limits of Elmhurst, Ill.—one of Chicago's better Western suburbs. Strangely enough, this nonmetallic mineral operation blends rather well into the quiet residential atmosphere of the city. Much of the credit for subduing what otherwise could be an unholy eyesore in a suburb is due to the close cooperation between company and city officials and to the willingness of the company to spend a good many dollars for general maintenance and upkeep of its plant and property.

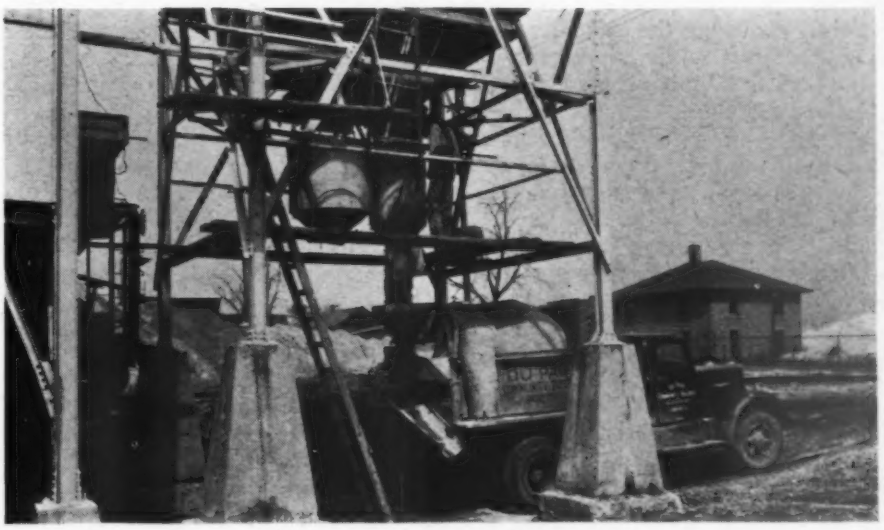
We discussed this subject recently with the company's president, George F. Hammerschmidt. He asserted that company policy has always placed great emphasis upon maintenance and upkeep of equipment and property, and the effect of consistent maintenance is pleasingly apparent in the company's freshly painted buildings and bins, the clean quarry, and the general orderliness, both inside and outside, of all company operations. We strongly suspect that the dollars spent for general upkeep have been repaid many times, not only through the prolonged life of the equipment but in the reduced antagonism to the company's very location.

For several years the company has operated a concrete block plant in conjunction with its crushed stone operations. In January, 1947, the owners decided to expand their block operations and accordingly bought and installed a Besser Super Vibrapac. The two lower-capacity machines, which the Vibrapac replaced, were maintained in good working order and currently produce the special concrete masonry units; e.g., tapered or cone block. This arrangement permits uninterrupted production on the higher capacity Besser machine without shutdowns normally required for changeovers.

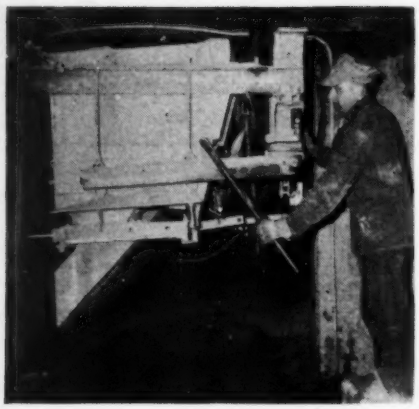
The plant currently turns out approximately 4800 8-in. equivalents every 9-hour day. About one-half of the production is lightweight blocks made from expanded slag. Although no exact statistics were available, these lightweight blocks weigh around 28 lbs., have excellent surface characteristics, and meet all A.S.T.M. requirements. Large quantities of these lightweight blocks are going into a multi-million dollar housing project now being built in Elmhurst.

Because the P.C.A. has a testing station on Elmhurst-Chicago Stone Company's property, there is little need for company-owned testing facilities. When the association moves to its new quarters in Skokie, Ill., the company plans to install its own testing equipment in the vacated building.

All aggregates are brought to the plant by rail and unloaded onto either one of two Stephens-Adamson belt feeders beneath the track. The feeders discharge into bucket elevators which load the storage silos. Ample space is available alongside the track for outside storage piles. Bulk cement drops from the car into

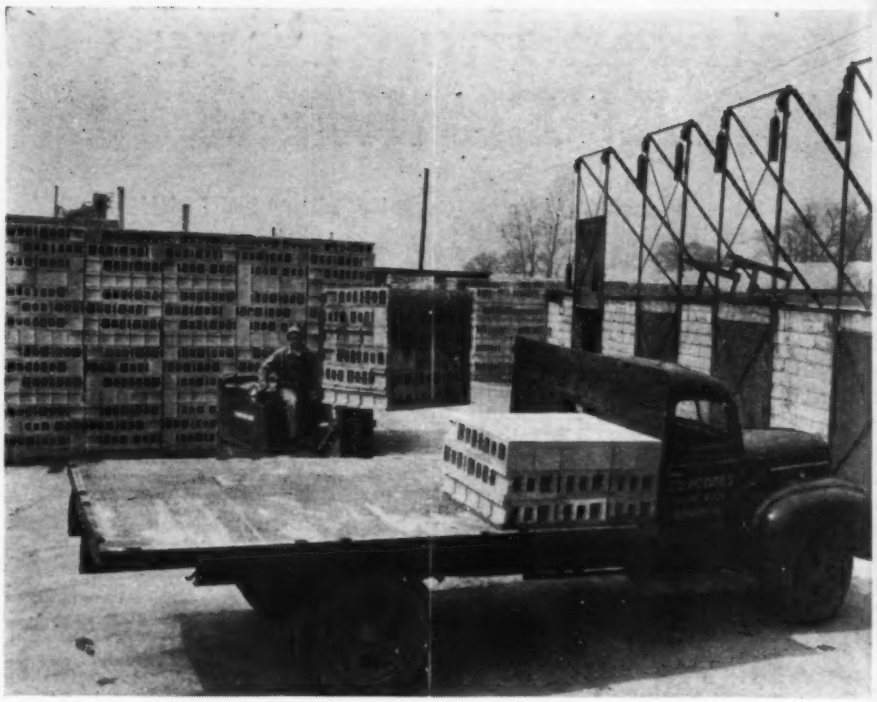


• A general view of the Elmhurst-Chicago Stone Company's concrete block and ready-mixed concrete plants. Crushed stone for both operations is supplied from the company's quarry only a few hundred feet away. • Right: A closeup of the small ready-mixed concrete plant. For the present, ready-mixed operations are confined to batching concrete for customers only, as the company does not own any transit mixers.



• This two-beam traveling weigh batcher facilitates charging of the mixer. Suspended from overhead rails, this power-driven machine is automatically positioned under the various bins and over the 50-cu. ft. mixer by means of limit switches.

• The operator cleans the pallets with a blast of compressed air as he loads them at the back of the block machine.



• Loading time is minimized at Elmhurst. Here one of the company's gasoline fork-lift trucks loads a flatbed in a few minutes. Cubing not only facilitates material handling, but also improves the appearance of the yard.

an 8-in. screw conveyor which feeds a bucket elevator loading a 625-bbl. 2-compartment Butler bin. This bin supplies the cement for both the block plant and a small central batch ready-mixed concrete plant.

All crushed stone, of course, comes from the company's stone plant about 400 ft. away, while sand is purchased from other outside sources. In the near future the company plans to open a new sand and gravel plant on a deposit 30 miles from Elmhurst.

The storage system consists of two concrete silos: one 4-carload, 4-compartment bin for crushed stone; and one 7-carload, 2-compartment facility for lightweight aggregates and sand. Live steam may be piped into either bin during the winter months.

A Butler 2-beam traveling weigh batcher moves the aggregates and cement to the mixers. This power-driven machine is suspended from rails running the entire length of the mezzanine floor. The batcher is automatically positioned under the various bins and over the 50-cu. ft. Besser mixer by means of limit switches which are actuated by push-button controls.

The green molded units are placed on conventional steel racks which will hold 72 8-in. standard units. A Towmotor gasoline fork lift truck (the company operates two; one inside, and one outside) hauls the green blocks to the curing rooms and returns the empty racks to the block machine. Pallets are cleaned at the rear of the machine by directing a blast of compressed air on each unit.

A battery of 12 curing rooms provides flexible and adequate kiln space. Each room will hold 27 racks or 1944 8-in. units, giving a total curing space for the plant of 23,328 blocks. Heat losses through the roof are minimized by a 6-in. slab of solid concrete and by sliding steam-tight doors at either end.

The blocks are soaked with live steam at 120 deg. F. for 24 hours. Best results are obtained at this plant by leaving the steam on for the entire 24 hour period and yard curing the blocks for three weeks.

All the kilns open on a spacious paved storage yard. As the racks are pulled from the kilns, the blocks are removed and cubed, 90 blocks to a cube. Cubing is done by hand. Experience has indicated that cubing not only appreciably cuts down loading time but also permits stockpiling in an orderly and uncluttered manner.

At our recent visit to the plant we learned that the company plans to build several concrete masonry homes which will be rented to plant employees. If the homes only approximate the verbally projected plan, we feel certain that concrete masonry construction will have received a boost which will favorably affect block sales not only in Elmhurst but throughout the Midwest.

Officials of the Elmhurst-Chicago Stone Co. include George F. Hammerschmidt, president; Martin Hammerschmidt, secretary-treasurer, and Herbert E. Manahl, superintendent.

20th Anniversary of Founding Celebrated by Texas Concern

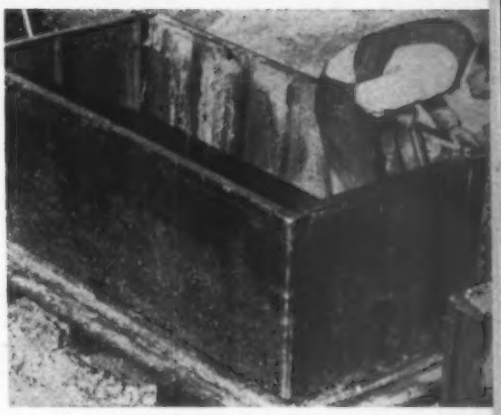
Twenty years of continuous operation were completed recently at Dallas, Tex., by the Chase Building Products Company, headed by John S. Chase.

The firm, which has grown from a small plant in Fort Worth in 1928, today employs 200 persons in seven plants throughout Texas. The Dallas branch was established in 1936. Principal product of the firm is concrete tile building block, which was used extensively during World War II in the construction of army installations. These blocks, sold under the trade names of "Dalcrete" and "Worthcrete," are now finding markets in neighboring states. Other officials of the Dallas branch include the following: James F. S. Campbell, vice-president; H. E. Allen, sales manager.

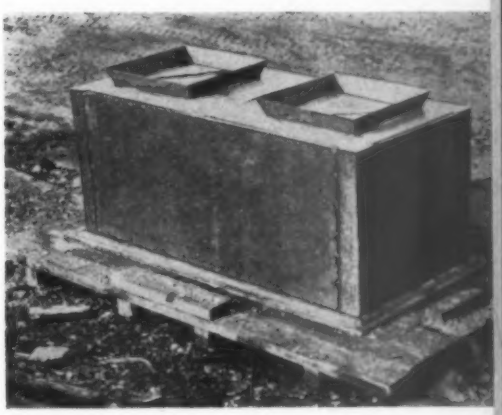
Residents of the Tracyton community at Bremerton, Wash., are visiting a newly-completed exhibition home built by the Mortarless Block Company of that city. The four-room home will be equipped with radiant heating.

1. The plant and yard of the Virginia Sand & Gravel Co., Richmond, Va., one of the country's largest manufacturers of precast concrete septic tanks. Production at this plant was immeasurably speeded-up through the use of the new Carpenter collapsible steel forms and a special-designed Carpenter handling and turning rig.

Picture Story Illustrates How One Company Boosted Septic Tank Production



2. With the aid of a small pointed tool, the workman tightens the locks (two in each corner) which rigidly secure this inside form. The company employs 24 inside forms and 12 outside forms.



3. With reinforcing wire in place, this inside form will be sprayed with oil. The manhole cover is cast in place so as to form both the cover and the manhole opening in a single pour.

4. Ready-mixed concrete is supplied from a mixer mounted on a flat-bed trailer. Four hours after a tank is poured, the outside form can be stripped and moved to another tank.

5. The Carpenter "automatic gripping tank turner" slowly lifts and revolves the cast tank. When the tank is upside down the inside form is collapsed and pulled out.

6. The truck crane picks up the inside form and heads for the pouring platform, where the manufacturing cycle will start over again.

Granite-Faced Blocks —

Pleasing Random Stone Effect Achieved by Imbedding Granite Chips in Cast Units

another ON THE SPOT report

THROUGHOUT the history of the precast concrete masonry industry a good deal of ingenuity and effort have been expended in attempts to glamorize the product by giving it a superficial resemblance to other materials. One of the earliest efforts in this direction was the rock-faced unit, which had convex irregularities in one surface. These irregularities were naively thought to make the finished wall resemble natural rock, which may possibly have been true on a dull day if the observer stood off at a distance of a quarter of a mile.

By WILLIAM M. AVERY

• This view of Captain Ware's auto port on the outskirts of Tampa, Fla., shows the pleasing overall effect achieved with Durbin Stone Company's granite-faced units in exterior walls.

More recent attempts have involved the utilization of natural materials as a facing bonded to the concrete. Judging from the number of inquiries we receive, there is considerable interest in certain localities in the development of faced units which might overcome customer resistance to exposed concrete masonry walls. Not long ago we inspected and photographed a patented process of this type at the Durbin Stone Co. in Tampa, Fla. Here the process, which is licensed by the Tomlinson Limestone Co. of Muncie, Ind., involves the application of granite chips to the surface of units which are cast in metal mold boxes.

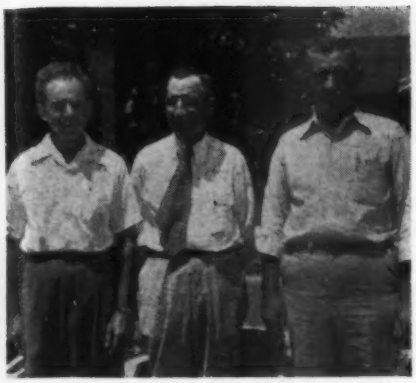
The Durbin company has been working with the process on a purely experimental basis since the summer of 1947, and is now on the verge of installing production facilities for the purpose of increasing output and reducing labor cost.

The standard unit produced measures 6 by 11¾ by 23¾ in., with fractional lengths running ½ and ¾. Forms, made of 16-gauge sheet steel, are in two sections which are locked together at the corners with hexagonal keys. Concrete is first placed in the bottom of the mold, whereupon the cores are wedged between the sides before filling the remainder of the box. The cores, which are also made of light-gauge steel, have slip locks at each end so that they may be collapsed and removed after the form is stripped.

A very wet mix is used in order that the concrete may spread itself readily in the form. Standard port-

• Right: A closeup view of a section of finished wall. Beads between the separate pieces of granite are made in the plant; those covering the mortar joints are, of course, applied on the job.

• Below: Granite chips are sorted and piled in the precise patterns in which they will be applied to the units.



• Vincent Babiy (left) and William M. Durbin (right) are partners in the Durbin Stone Co. The gentleman in the center is Frank I. Blatt, who is studying the plant for the purpose of recommending equipment with which to speed up production.

land cement and Lake Wales sand are batched in the proportions of 1 to 4, with 2 percent calcium chloride and 1 ounce of Darex in a standard 1-bag mix. Mixing time averages between 4 and 5 minutes.

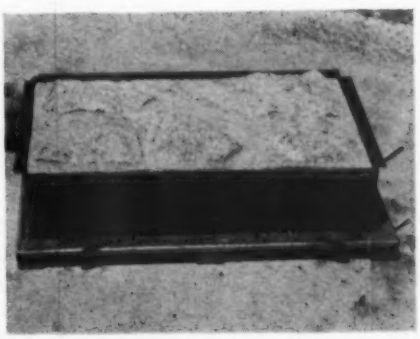
At the Durbin plant the units are faced with granite chips supplied by the Davidson Granite Co. of Lithonia, Ga. There is little actual selection of the material, which is a by-product of the Davidson quarry operations, but the user prefers that the sizes fall in the range of 6 by 6 in. up to a maximum of 12 by 24 in. The chips, which are shipped from Lithonia to Tampa in open-top cars, are sorted, shaped and sized by hand at the user's plant. Desired shapes and sizes are produced by breaking large pieces or by chipping smaller fragments with hammers. The chips are then carefully arranged in piles or in wooden trays in the exact sequence and patterns in which they will be utilized in the finished product. This is probably the most important step in the entire process, since the appearance of the faced units is almost wholly dependent upon the care with which the patterns are worked out. Every effort is made to select and sort the stone so that each individual unit will be not only unique but pleasing in appearance.

Immediately after the mold is struck off the granite chips are bedded into the top face of the concrete. Since the wall thickness of the unit is about 1½ in. before the facing material is applied, it is the practice to imbed the stones from ¾ of an inch to an inch below the top of the mold box, assuring firm bonding of the two materials after the concrete is set. Within 45 minutes after the stones are placed, or as soon as the concrete stops bleeding, a ¾-in. hand-tooled bead is run between the pieces of granite. The concrete already in the mold box is used for this purpose. It is the practice to bear down hard with the hand tool in order to force out any air bubbles that might be trapped around the stones, and to pull the concrete up around the edges of the stones to assure a firm interlocking of the two materials.

The bead has an additional aesthetic function in the finished wall. When the blocks are laid up the mason strikes beads of the same size over the mortar joints, making every effort to give his work full continuity with what has already been done at the plant. Thus, instead of running true horizontal or vertical beads, which would call attention to the block pattern and destroy the random effect of the stone facing, the mason attempts wherever possible to swing the mortar joint beads into those which separate the individual stones.

Units which are cast in the early morning are usually stripped after 7 or 8 hours, while those cast in the late afternoon are stripped the following morning. To prevent damage to the concrete the forms and the cores are coated before each use with a mixture of axle grease and kerosene. Obviously, on a one shift operation, it is possible to produce only one unit for each mold box. After stripping the units are immediately covered with burlap which is kept saturated with water for at least 24 hours. This is followed by curing in the open for several days with water sprays.

With a 4-man crew working in the plant the Durbin Stone Co. is currently producing about 200 sq. ft., or 100 standard units, per 8-hour day. This covers all the work involved in the process, including sorting and sizing the stone. The apparent output per man-day is hardly indicative, however, of what could be done on a production basis, for the plant lacks even the most rudimentary labor-saving facilities. To date the company's entire effort has been concentrated on mastering the process in order to produce a quality product with which it could determine customer acceptance and demand. With this hurdle out of the way, it is now the intention to develop the plant along production lines, with reasonable assurance that output per man can be doubled without unreasonable expenditures for equipment.



• A view of one of the mold boxes just before the completed unit is stripped. The mold is made in two sections which are locked together by means of hexagonal keys.

Compression tests on the product have so far averaged in the neighborhood of 1,700 p.s.i. at 8 days, but the company intends to bring the strength up to approximately 2,300 p.s.i. in order to compensate for the difference between the 6-in. wall built with its product and the widely accepted 8-in. wall built with standard masonry units. The full-sized granite-faced unit, which lays up 12 by 24 in., weighs between 60 and 70 pounds. Despite this apparent weight handicap, it is claimed that masons lay up approximately the same number of square feet of wall per day as with standard 8-in. units, since the total weight handled in the case of the faced units is about 30 percent less. We can't wholly subscribe to the logic of this reasoning, but perhaps the masons in the Tampa area are more reasonable chaps than those in other localities.

Actually it is claimed that the faced units are somewhat cheaper to lay than standard masonry units, primarily because of a considerable reduction in the amount of mortar required per square foot of wall. An additional advantage which is pointed out in connection with maintenance is that settlement and shrinkage cracks are far more likely to occur at joints, where repair is simple, than through the granite facing itself. The selling price per square foot of finished wall is said to be only 15 percent higher than for an 8-in. wall built with standard units and properly painted.

While we were in Tampa we inspected a recently completed tourist court in which Durbin granite-faced units were used exclusively for the exposed walls. The effect achieved is definitely pleasing. For some reason photographs of the walls seem to accent the rectangular outlines of the basic unit in a manner that isn't apparent to the naked eye. The appearance of the product in place should therefore not be judged too literally from the cut on page 140.

War-Born Concrete Products Plant Supplies Eight Southwestern States

another ON THE SPOT report

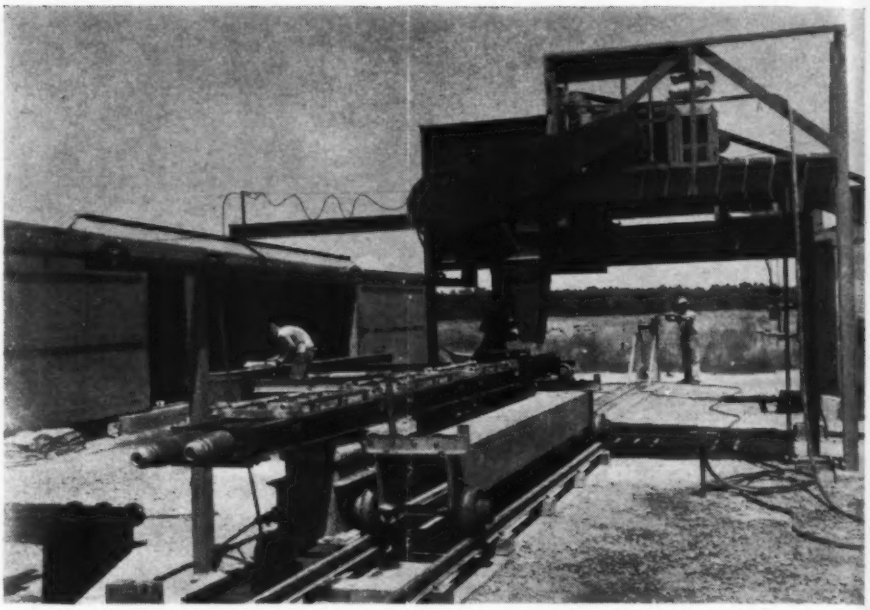
THE area in and around Denver, Colorado, located near the geographical center of the United States, profited greatly from wartime expansion and continues to grow at a rapid rate. Denver's population in 1940 was 322,412 and is now unofficially estimated at over

By WALTER E. TRAUFFER

half a million. Proposed construction in this area is estimated at over $500,000,000. With this growth there has been a commensurate expansion in the production of building materials of all kinds.

One of the industries which came in on this boom is the new plant of the Flexicore Company of Colorado, one of the first plants west of the Mississippi River to make the patented Flexicore floor and roof slab. The company holds licenses for Colorado, Wyoming, southwestern South Dakota, western Kansas, Nebraska and Oklahoma, New Mexico, and the Panhandle of Texas. Formed in May, 1945, the company got its plant in operation in September, 1946, and has operated continuously ever since. Its 1-shift capacity has averaged about 700 sq. ft. of joist daily which has been insufficient to meet the demand in Denver alone. As soon as the necessary equipment can be obtained the plant will be expanded.

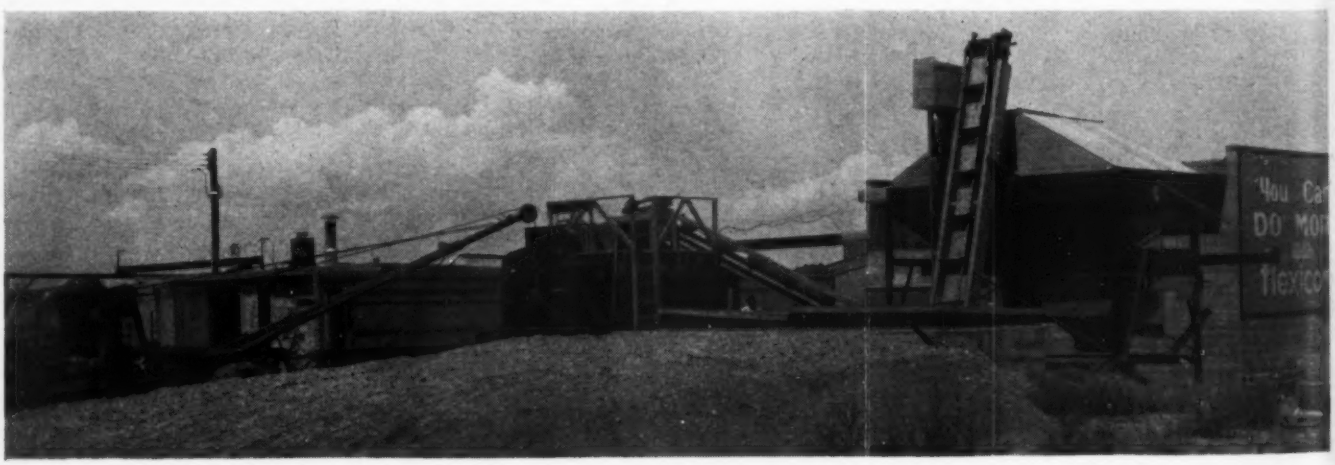
The plant was designed by local engineers from plans suppplied by the Price Brothers Co., Dayton, Ohio, which controls the Flexicore patents. It is fireproof and permanent, being built entirely of concrete, cinder block and steel. It is designed so that the forms never touch the ground and travel in a closed circuit assembly line which brings the empty form back for refilling. At present, with only about one-fourth the forms needed for full 1-shift operation, the superintendent and 3 men produce 700 ft. daily. With the additional forms the plant, as it stands, would make 2000 to 2500 sq. ft. daily with about 8 more men. At present about half the output is used in commercial structures such as warehouses and half is used in residential construction.



• Concrete mix is discharged from an overhead mixer into a steel form which rests on vibrating piers. The entrance to the kiln is at the left.

The standard 6- by 12-in. slabs made in this plant use ⅜-in. pea gravel and sand as aggregates. These are brought in from a local producing plant by truck. "Peralite," the light-weight expanded perlite aggregate made by the Alexite Engineering Co. at Colorado Springs, Colo., has been used, experimentally at first, and later commercially and the demand for these light-weight slabs is increasing. They are used for flat roof slabs. The Peralite slabs weigh about 21 lb. per sq. ft., compared to 40 lb. for sand and gravel, and test 2600 p.s.i. compared to 3200 p.s.i. The perlite is also used in two sizes and is brought to the plant in trucks.

The aggregates used in this plant are dumped from trucks into two 7-cu. yd. concrete hoppers from which a belt bucket elevator feeds them into a 7-cu. yd. Concrete Ma-



• A general view of the new plant of the Flexicore Company of Colorado. Aggregates are stored in the 7-cu. yd., 2-compartment steel bin at the right.

chinery Co. 2-compartment steel bin. The hoppers and bin are kept covered to insure even moisture content. The two sizes of aggregates are discharged into a 1-cu. yd. Concrete Machinery Co. weigh batcher on a trolley rail which discharges the batch on a belt conveyor to the mixer. Cement is dumped into the 1-cu. yd. open-top mixer from sacks. This cement is brought out from the 1½-car capacity storeroom on another belt conveyor. Water is measured into the mixer from city mains by a Worthington-Gamon meter.

The concrete is discharged from the mixer into the slab form on a vibrating table. The steel form, which is 12-in. wide, 6 in. high, and long enough to make 22½-ft. slabs, consists of two sides and a bottom pan, the latter making the finished side of the slab. Adjustable bulkheads determine the length of the slab and make possible the manufacture of two short slabs in one form.

The reinforcing consists of two ¼- to ⅜-in. rods in the top of the slab, depending on the length, and two or three in the bottom which vary from ⅜ to ⅝ in. in diameter, depending on the load capacity desired. No. 9 wire stirrups are spaced 18 inches to 30 inches on centers and are welded to the top reinforcing bars. Extra stirrups near the ends of the slab take care of shear. The bottom reinforcing rods are butt-welded to threaded bolts in the plant and are then prestressed in the form with a Torquometer, a special type of industrial tension wrench. The stress used varies from 20 ft. lbs. for the ⅜-in. rod up to 50 ft. lbs. for the ⅝-in. rod. The two 4⅝-in. dia. rubber tubes which make the cores are then inserted into the form and inflated to 35 lb. pressure. An Agnew tank-mounted compressor supplies air for the tubes, and for spraying the forms by means of an oil pot.

After the form has been thus far assembled on the stationary assembling table it is rolled off onto a transfer car. There the hose positioning clamps are put in place. The completely-assembled form is then carried on the transfer car to the vibrating table, which has three Gwynne vibrators. A hand winch is then used to move the form slowly under the mixer as the concrete is discharged into it. An American Engineering ½-ton overhead electric hoist is used to remove the slab form from the vibrating table to the kiln car on which it is screeded before it is rolled into the curing room.

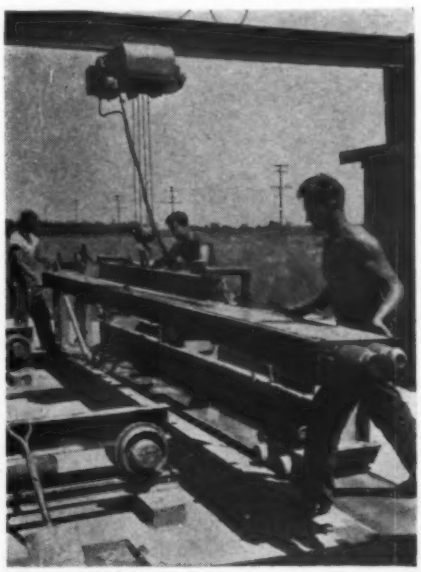
The curing room is 31 ft. wide and 56 ft. long and is built of cinder block with glass wool insulation and an inner lining of corrugated sheet aluminum. There is a Herman-Nelson fan-type heater and over it a steam jet from a Heat-Pak vertical oil-fired boiler. This construction not only insulates but condenses moisture on the walls and ceiling of the room to keep it humid. A temperature of from 90 to 120 deg. F. is used.

After curing for 12 hr. the form is rolled out to a roll-over table where two men, one at each end, roll the forms over with canvas slings as they are lifted by another ½-ton American overhead electric hoist. The bolts, pan, etc., are then removed and the empty form is rolled back to the assembly table, making a complete 4-sided closed circuit of the plant.

The slabs are yarded by a Ford truck equipped with a Gar Wood winch. They are stacked and covered with gunny sacks which are kept wet until ready for shipment.

The men at the head of this concern are well qualified by experience to pioneer this new product. Paul N. Newstrom, president, is a general contractor; Lloyd S. Brannan, vice president, is president of the Brannan Sand and Gravel Co., the largest producer in the Rockies; S. A. Harrison, secretary and general manager, is an industrial engineer; Jerry Bergman, superintendent, has had wide experience in concrete construction work.

• Hose positioning clamps prevent the hoses from floating when the concrete is placed in the form.



• Left: The rubber hoses which act as cores are inflated with air to 35 p.s.i.

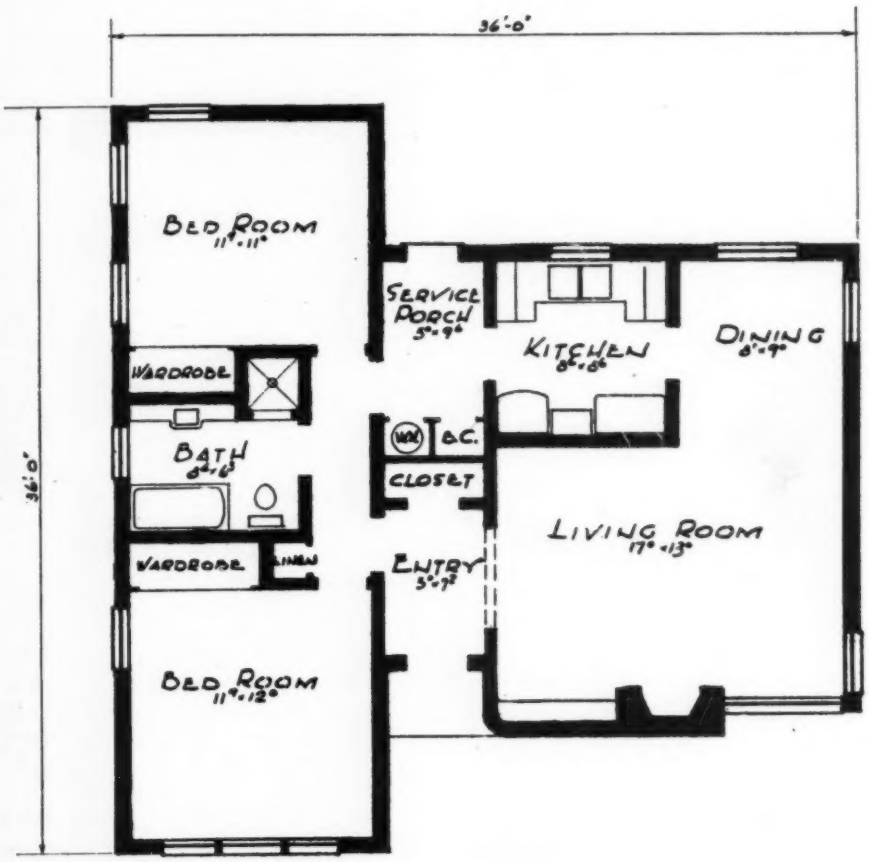
• Above: The slab form is shifted from the transfer car to the kiln car with an overhead electric hoist.

• Concrete is screeded after the form is in position on the kiln car.

Edward A. Bagge, former treasurer and one of the founders of the Cincinnati Cement Products Company, died recently in Santa Monica, Calif., where he was spending the winter. He had retired from active business life five years ago.

Bigger Sales Thru

The two homes illustrated on these pages are built of concrete block. Both are well yet economically constructed, pleasing in design, and, we believe, a gracious addition to

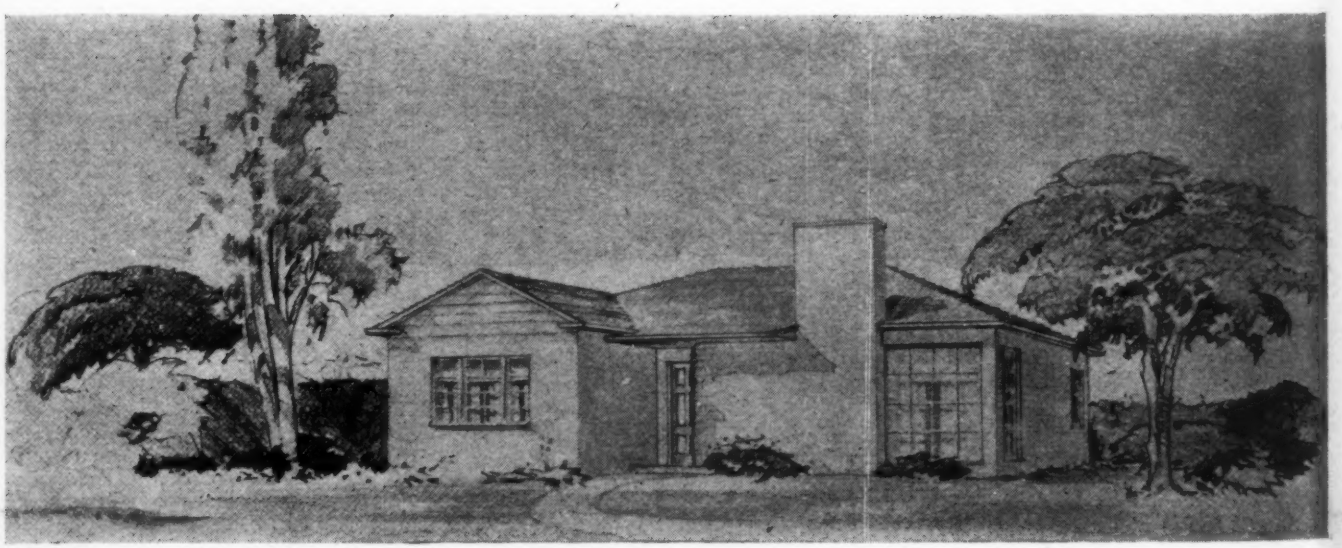


IN ANSWER to one of our nation's severest problems—the scarcity and the high cost of housing—more and more people are turning to concrete masonry units. Homes, for example, built of reinforced concrete blocks are low in cost, strong, durable, have good insulation features, and, if wisely planned, are pleasing in appearance and flexible in design. Moreover, concrete masonry units are available in nearly all communities.

Unfortunately, however, archaic building codes, restrictive practices on the part of a few unions, several bad examples of concrete block construction, and a general apathy towards concrete units as an established building material have delayed the solution of our country's housing shortage.

Constantly fighting this prejudice against concrete masonry homes are organizations like the National Concrete Masonry Association. This group has helped revise building codes, has familiarized engineers and architects with the advantages and proper use of concrete masonry units, and has promoted high and uniform standards of production throughout the whole products industry.

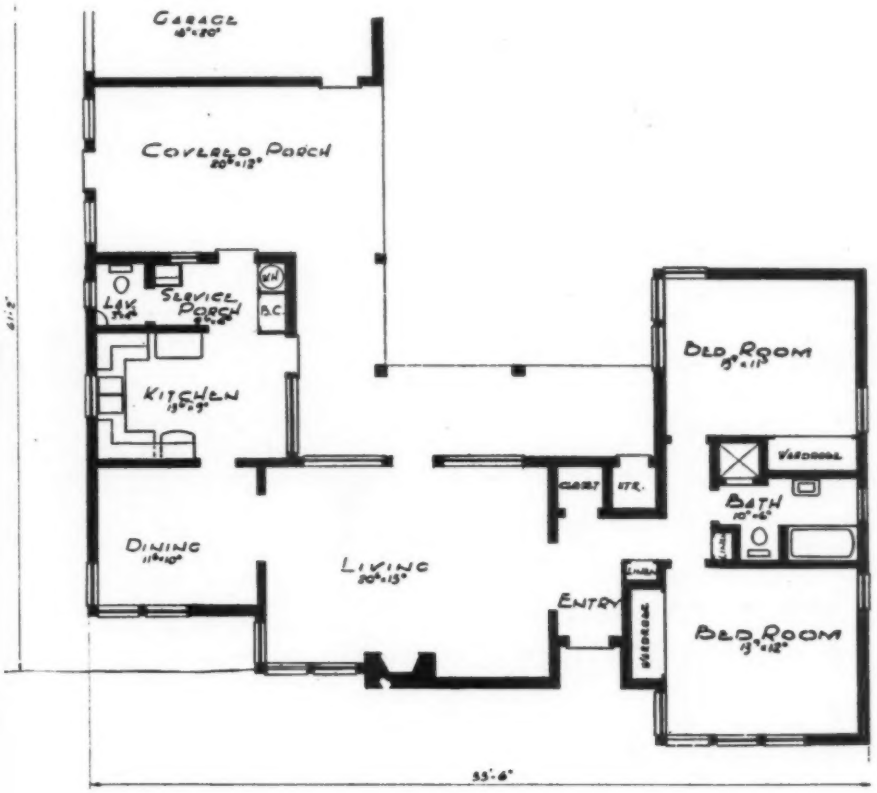
One of the N.C.M.A.'s best promotion schemes is its plan service.



Better Promotion

any community. Similar homes, put up for demonstration purposes by concrete block producers, have favorably influenced the sale of concrete masonry units.

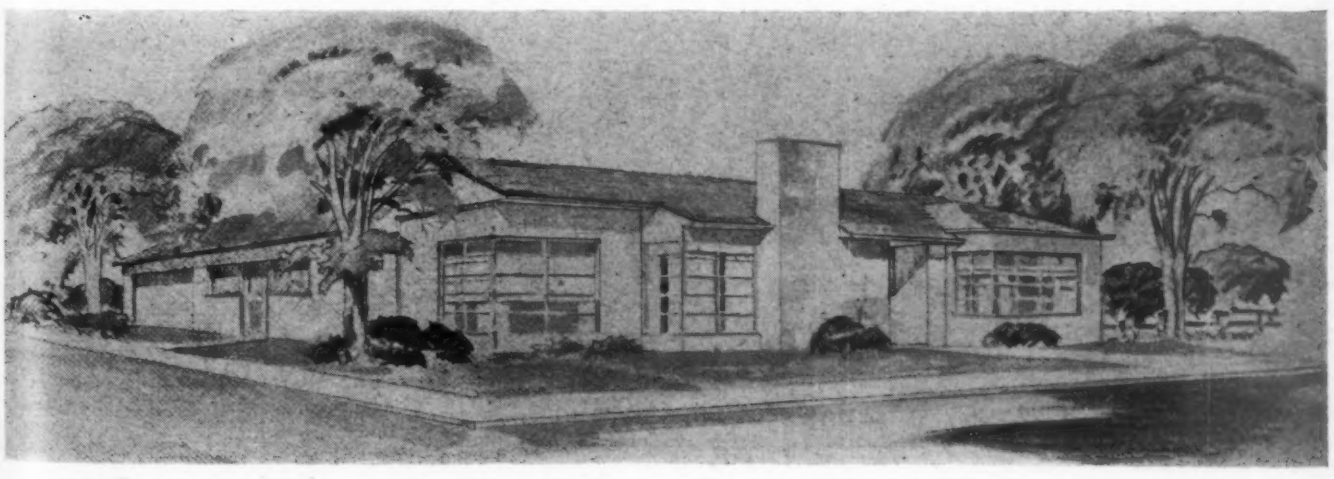
Carefully screened portfolios containing attractive pictorial sketches and floor plans of concrete homes are sent to concrete masonry producers, who in turn may purchase at nominal cost large numbers of these booklets for further distribution to architects, engineers, contractors or any others interested in building homes.



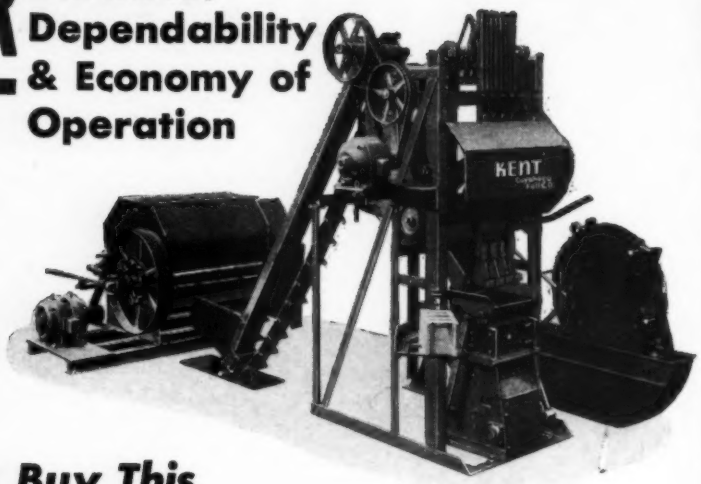
As a supplemental part of the plan service, the N.C.M.A. will also supply mats for use in newspaper advertising. In addition, scale models of concrete masonry homes are available for display in local store windows, home building shows and other public functions. Intensified promotion efforts along these lines can't help but stimulate the use of concrete masonry units.

On these two pages are reproduced drawings of two homes taken from a plan portfolio prepared by Brown & Treadway, Los Angeles, Calif. In both homes particular attention has been paid to features that are important to comfort as well as to economy. Although the architect created these homes for Southern and Southwestern climates, plans of homes suitable for the colder regions will soon be available.

Because many people cannot afford tailor-made plans, this firm has prepared a number of stock blueprints. Each plan-order includes three sets of working drawings, two sets of specifications and one set of engineering calculations. The cost is $50 for the first set and $5.00 for each additional set.



FOR Balance, Dependability & Economy of Operation



Buy This

COMPLETE KENT PLANT

The efficient coordination of design and operation of each related machine in this relatively compact, complete Kent plant assures the purchaser a well balanced outfit that will produce more blocks economically and dependably.

In a short time it is possible for this plant to earn the initial investment required for its purchase.

Operating as a single complete unit, or in groups, these smaller Kent plants repeatedly earn excellent performance ratings, producing 1500 blocks per 8 hour day per plant.

Available with the batch mixer as shown or with the popular Kent Continuous Mixer.

GREATER UNIFORMITY of Block Texture and FASTER PRODUCTION with the NEW KENT *SPLIT BAR TAMPER*

Regardless of your present block production, this new Kent development merits your complete investigation.

This ruggedly constructed eight bar attachment is easily adapted to all Kent machines, new or old, to assure greater uniformity of block texture with a definite production speed-up.

Make more, harder, denser blocks per day with the new Kent Split Bar Tamper.

The KENT MACHINE COMPANY

Manufacturers of CONCRETE PRODUCTS MACHINERY *Since 1925*

CUYAHOGA FALLS, OHIO, U.S.A.

Send complete information and prices as checked below.

- ☐ Plant illustrated above
- ☐ Plant with Belt Drive
- ☐ Complete set of Block Machinery Literature
- ☐ Plant with Batch Mixer
- ☐ Larger Complete Plants
- ☐ Split Bar Tamper

Name.....Address.....

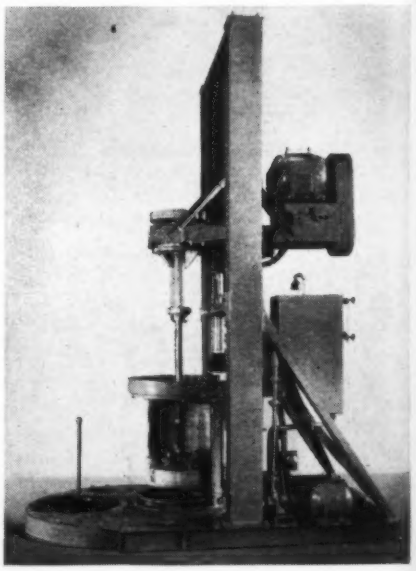
City.....

NEW MACHINERY and SUPPLIES

● Pipe Machine

The new Martin Model 48 packerhead concrete-pipe machine, just announced by the Martin Iron Works, Los Angeles, incorporates a number of features of interest to the concrete-pipe industry.

The Model 48 can produce both tongue-and-groove irrigation pipe and



bell-and-spigot sewer pipe in sizes from 4- to 24-in. diameter and up to 36 inches long. A new horizontally-mounted 30-hp. motor with multi-speed transmission, an adjustable hydraulic system, plus a flywheel for storing energy when needed, are used. This combination provides the proper troweling and packing action of the packerhead as it revolves and raises through the jacket. Thus, motor load and packing efficiency are properly synchronized for maximum speed and quality in production.

The main drive is through multiple V-belts, a 3-speed industrial-type transmission, and a 7-to-1 ratio set of spiral-cut bevel gears. This drives the newly-designed extra-heavy packerhead shaft and spud tip. A heavy flywheel mounted on the top end of the packerhead main shaft assures uniform transmission of power to the packerhead because it effectively cushions, by its inertia, any fluctuation of speed and power. The flywheel is capable of imparting up to 20 additional horsepower to the packerhead in case of over-packing. The flywheel increases and improves the ability to make hard-packed pipe and results in a smoother interior finish.

All shafts and bearings are protected against dust by oil seals. A unique hopper hold-down automatically clamps the hopper at the proper jacket height and prevents the hopper from raising until after the pipe is made, no matter how

tight the pipe is packed at the rimmer.

A finger-tip control valve in the hydraulic system regulates the upward travel of the packerhead without changing its fast downward fall. Controlled speed up, with maximum speed down, helps to account for the high production capacity of the Martin 48. High speed of the packerhead (326 r.p.m.) is used in making 4- and 6-in. pipe; intermediate speed (244 r.p.m.) for 8-, 10- and 12-in. pipe; low speed (116 r.p.m.) for making 14- to 24-in. pipe.

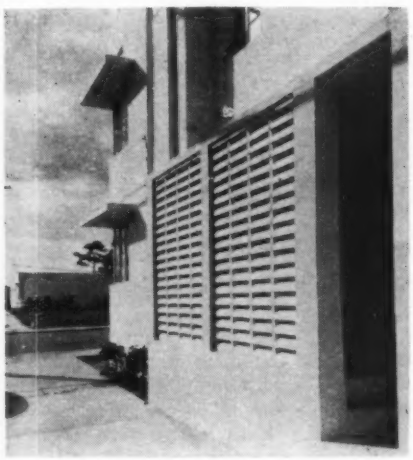
The all-steel turntable rolls on sealed ball-bearings and requires little effort to rotate. The operating cycle is swift, simple and neat, with the minimum of waste concrete cluttering up the base of the machine.

Complete details may be obtained by reference to the above description in asking for the new Martin 48 catalog. Requests should be addressed to the Martin Iron Works, 1222 E. 28th St., Los Angeles, Calif.

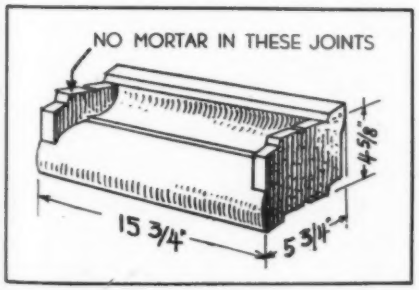
● Ventilator Block

Earl A. Kleb, Miami, Fla., has patented a ventilator block which is cast in an aluminum mold. The mix proportion consists of three parts white sand and one part white cement.

The ventilator block is said to have



a wide variety of application, and is used to advantage in patios, garages, walls, fences, sun decks, porch railings, home work shops, breezeways, bathroom windows, and air conditioning, roof



gable and heating ventilators. It is also said to be effective in the construction of stores, offices, warehouses, apartments, hotels, pools and pavilion walls, sanitoriums, and factory buildings.

Franchise rights are available through Rumsey Southeastern Distributors, 200 N. W. 22nd Avenue, Miami, Fla.

● Vibrating Equipment

Vibro-Plus Corporation announces a line of concrete vibrating equipment including electrically-operated external vibrators and internal vibrators powered by either electricity or gasoline, or pneumatically driven.

The model ERSB vibrating spade is driven by a 1-hp. motor designed for 110-220 volt, single- or three-phase 60-cycle a.-c. current. The pneumatic type, model LRSB, uses a 1-hp. power unit operating at an air pressure of about 55 p.s.i. It uses from 18 to 39 cubic feet of air per minute, measured at atmospheric pressure. Specifications for all three models are the same, except for the type of power used.

Type 70 has a 2¾-in. diameter and a frequency of 9,000 vibrations per minute, while the Type 55 has a 2 3/16-in. diameter with a frequency of 13,000 vibrations per minute.

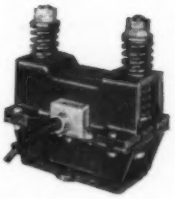
Officials of the G. A. Rizner Company, 1104 Grand Central Avenue, Tampa, Fla., report that this firm has taken over all replacement parts for the Blatt System of block plant equipment. An ample supply of parts is carried in stock at all times, especially high carbon cast steel mixer blades and high tensile reliners for the Blatt No. 12 mixer.

SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS

With Variable Controlled Power



Keep Your Bins, Hoppers and Chutes

Open and Free-Flowing!

Banged-up and dented bins and hoppers cost money in replacement and in man hours lost—and that's where SYNTRON Vibrators come in. They eliminate the arching and plugging that takes a man's time to pound, and damage, those bins and hoppers.

What they are—pulsating electromagnets that produce 3600 vibrations per minute from 110, 220 or 440 volt, 60 cycle A.C. There are no cams, gears or eccentrics—merely electromagnetic reciprocation from half-wave rectified current.

Where can they be applied—to any size and shape of bin, hopper and chute—whether made of steel, wood or concrete. Handling sand, gravel, rock, cement, aggregate, hydrated lime, etc.

How are they applied—thickness or gauge of hopper wall is the most important factor. However, overall dimensions, cubic content, degree of fineness and moisture content of material must also be considered.

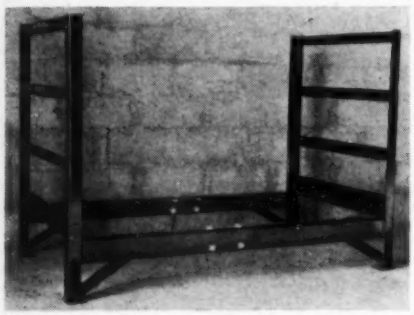
Write — giving the details of your troublesome bin, hopper or chute — our Engineering Department will be glad to give you their recommendations.

SYNTRON CO.

385 Lexington, Homer City, Pa.

● Steel Curing Racks

Knocked down steel racks for curing concrete blocks are furnished in two capacities by the Wood Brothers Manufacturing Company—the 48-block size and the 56-block size. Assembly is completed by welding the frame members to the end sections.



The blocks can be loaded and removed from either side. Both loading and unloading are possible in such a manner that the cross bars are shoved back or turned on edge without being removed from the rack. After unloading the rack can be taken back to the plant without handling of cross bars or trays. Wood Bros. Mfg. Co., Oregon, Ill.

● Pallet Spray

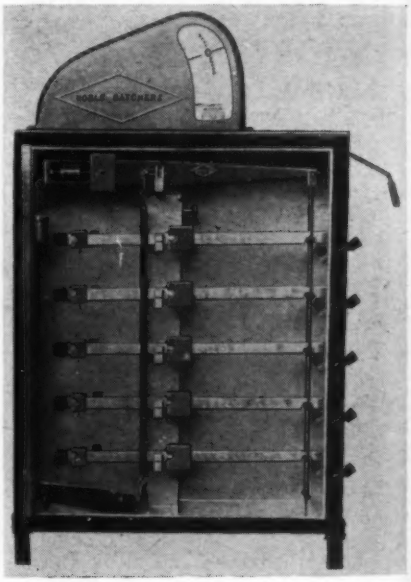
"Nopcowet B," a water dispersible mixture that may be sprayed or dripped on the pallet, is offered to the concrete products industry by the Nopco Chemical Company. An emulsion of Nopcowet B applied to the steel pallets as they are fed into the block machine acts as a lubricant and prevents adhering of the concrete to the pallets.

The manufacturers claim that unloading of the block for storage is facilitated and no time is lost in chipping off the accumulated concrete from the pallets. Production is reportedly stepped up as a result of fewer misshapen block. Brushing the pallets with a whisk broom after each unloading keeps them clean.

● Scale for Batching Plant

The Noble Company, manufacturers of concrete batching equipment, has introduced a dial scale as optional equipment on Noble weigh batchers.

This scale is available in manual and semi-automatic models. On the semi-automatic type, weight of cement required is set on a poise beam, and the cut-off at final weight is controlled by the Noble photo relay system of weight control. The dial indicator is at zero position when cement weight is completed. Aggregate weight is the cumulative dial reading from there on.



The Noble back balance multiple beam scale is standard equipment on manual and semi-automatic batchers and is recommended for use where accuracy is of utmost importance.

Both dial and poise-beam scales will be available. Noble Co., 1860 7th Street, Oakland 7, Calif.

● Concrete Cutter

Backlin Products Company's new "Stratedge" concrete cutter is driven by a 6-hp. engine and is equipped with a specially-designed diamond saw. The depth of the cut can be regulated from 1 inch to 3 inches. The manufacturers claim that it will cut up to 60 inches per minute, leaving clean, sharp, straight edges and sharp 90-degree angles at corners.

The Stratedge can also be used for scoring and works on concrete, marble, tile, asphalt and terrazzo. It is easily transported and is operated by one man.

BARTILE MANUFACTURERS ARE EARNING

Sensational PROFITS!

With the New BARTILE ROOFING MACHINE

ONE FRANCHISE*NETS $18,000 IN 6 MONTHS!

Concrete manufacturers and contractors are reaping big profits in the roofing industry on the increasing demand for BARTILE, the world's finest concrete roofing tile! Sales resistance disappears at the sight of beautiful, new BARTILE with its distinctive shape, wide range of colors and low initial cost. It is so attractive one job quickly sells another. These lightweight, strong, interlocking roofing tile are weatherproof, fireproof, and actually improve with age! Permanent BARTILE competes in price with ordinary combustible roofings.

Each BARTILE Roofing Machine is carefully designed and engineered for long, trouble-free service. Positive electric motor vibration insures uniform high-strength tile. Precision steel pallets make accurate units for perfect lay up. So simple to operate, an unskilled workman can easily produce one square (150 roofing tile) per hour after a few days' practice.

SENSATIONAL PROFITS FROM A MODERATE INVESTMENT!

WRITE TODAY

For complete information

E. P. BARBER CO.

900 West Valley Boulevard

Bloomington, California

*Name on request.

● Shovel with Snubber

Chief among several improvements which feature a new type of fork truck shovel attachment announced by Clark Tructractor is a pneumatic snubber

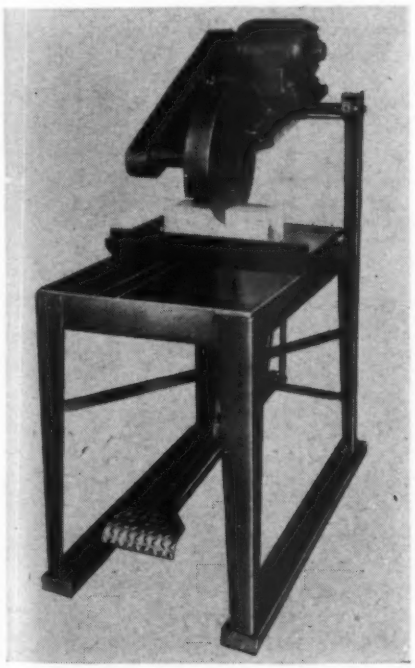
which minimizes the shock and strain to the upright assembly when the load is discharged.

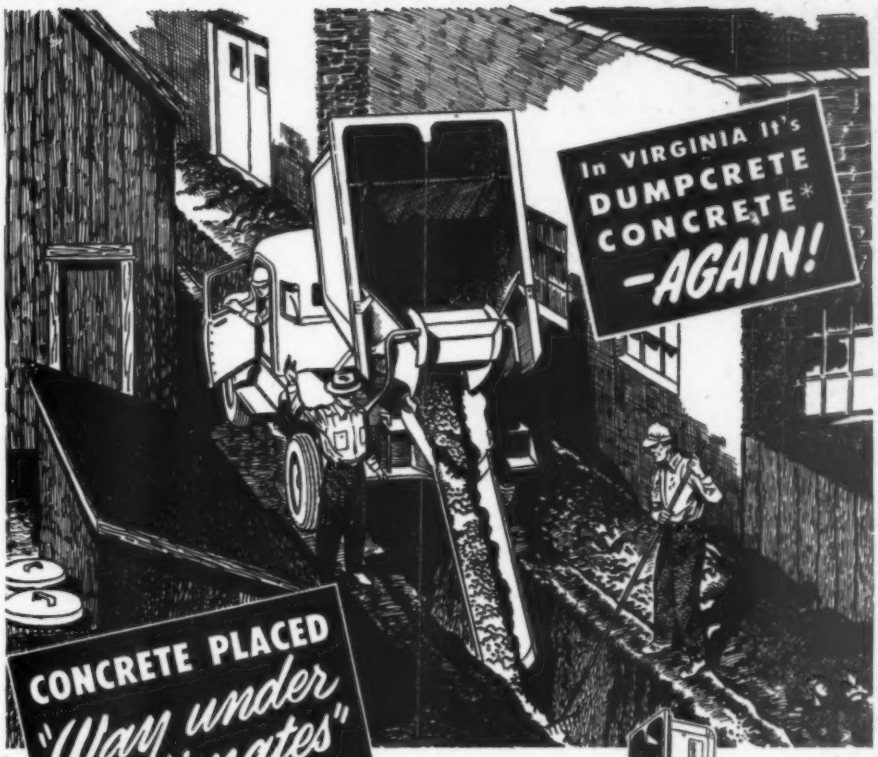
In addition to the snubber, the shovel has 3-point suspension, with a roller cam lock and a single point hook, which permits release of any load with a 15-pound pull. It is ruggedly built of ¼-inch steel plate, with a blade 6 inches wide, of specially hardened steel and flame-hardened edge. The blade is welded to the bucket.

The shovel is readily interchangeable with forks and all other attachments mounted directly to the standard fork bars on Clark fork trucks.

● Masonry Saw

A new model masonry cutting saw has been announced by the Champion Mfg. Co. Designed for fast and accurate cutting of all types of masonry and ceramic materials, it can be used for either wet or dry cutting. A 1½-hp. motor supplies sufficient power for cutting the hardest of materials. Diamond blades





CONCRETE PLACED "Way under Estimates"

It looked like a high-cost job—laying telephone conduit down narrow alleys in Front Royal, Va. Wheelbarrows were figured for concrete placing, as heavy truck mixers would break down the trench walls.

The estimator's face lit up when W. R. Miller wheeled his light-weight Dumpcretes right over the ditch. This fast, direct, low-cost method dropped costs "way under estimates."

Even on ordinary jobs Dumpcrete Concrete is cutting costs. Reports from users in 42 states show savings of $1.00 and more per yard. And with preferred air-entrained concrete they're getting top-to-bottom *uniformity* on every load.

You can deliver concrete "way under estimates" too. Write today for booklet "A Special Utility Body for Hauling Air-Entrained Concrete."

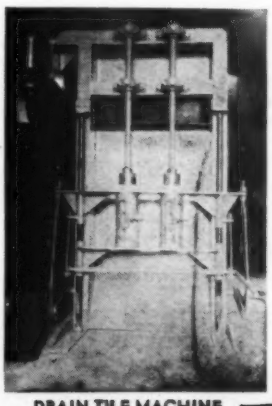
The Dumpcrete Body

Lightweight, watertight, loads fast, dumps fast or slow, places anywhere, costs less to buy and run. Ideal for hauling aggregate, coal and earth.

• • •

*** Dumpcrete Concrete** is central-mix air-entrained concrete hauled and placed with the speedy, low-cost Dumpcrete. Provides top-quality, plastic, workable and non-segregating concrete, saving up to $1.00 per yard.

DUMPCRETE DIVISION
MAXON CONSTRUCTION CO., INC.
473 Talbott Bldg., Dayton 2, Ohio



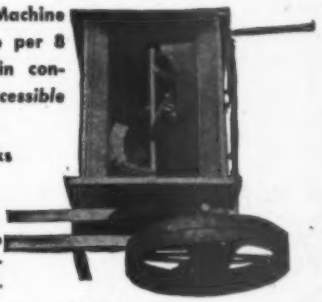
DRAIN TILE MACHINE

Write for Complete Information

HIGH PRODUCTION—LOW INVESTMENT

The Wooten Drain Tile Machine produces 2000 to 3000 tile per 8 hour shift. It is *rugged* in construction and *simple* and *accessible* in design. Price $685.00.

Delivery 2 to 5 Weeks



MIXER

WOOTEN MIXERS

Sturdily Built in Any Size to Meet Your Production Requirements. 9 Cu. Ft. Mixer $375.

C. M. WOOTEN CO. • 2717 Central Ave. Knoxville, Tennessee

"Marvel Automatic"
Drain Tile Machine

Makes both 4" and 6" standard drain tile. This is a production machine that is priced right. Quality of the product is not surpassed by machines costing many times the price.

A slight grip on the control arm forms and packs uniformly every tile from end-to-end—and in a matter of seconds!

No pallets required. No cogs, balances, weights, split-nuts, nor clutches to wear out!!!

The "Marvel Automatic" is heavily constructed of steel, with malleable cast iron castings.

Write for Catalog E, and add this Money Maker to your business without delay.

Molds for making bird baths, love seats flower pots, etc., also available.

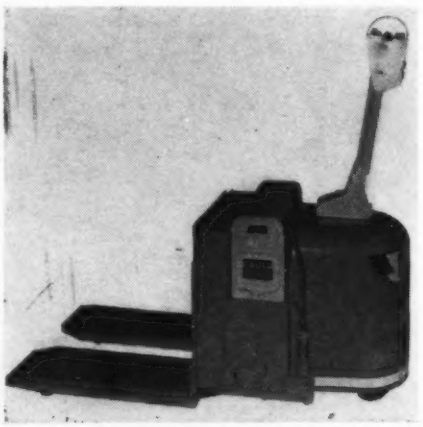
The Concrete Machinery Company
Hickory North Carolina

as abrasive masonry cutting blades can be used.

The cutting head of the machine can be controlled by a foot pedal or the head can be locked down for cutting or scoring. The new model has a self-priming centrifugal pump, with a self-contained watering system. Water coolant is used, except when chemically bonded brick is cut. Belts are covered, and the blade guard is designed for maximum protection for the operator. Sealed conveyor cart bearings guard against moisture and corrosion. Champion Mfg. Co., 2028 Washington Ave., St. Louis 3, Mo.

● Electric Lift Truck

The new Barrett "Pallet-Ox" travels electrically and lifts electrically. This truck is designed to operate with either single or double-faced pallets. It will operate in and out of freight cars or on and off motor trucks.

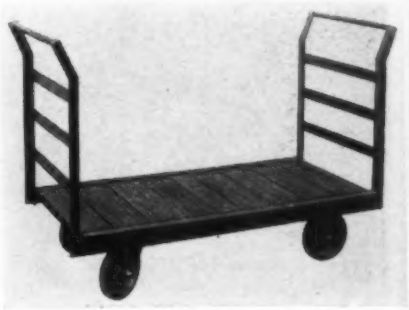


These trucks are equipped with batteries large enough to assure eight hours' operation without recharging. Barrett-Cravens Company, 3254 W. 30th Street, Chicago 23, Illinois.

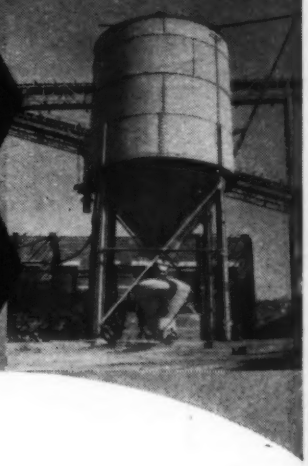
● Double-End Truck

A new general-purpose double-end truck has just been announced by the Palmer-Shile Company, 12662 Mansfield Avenue, Detroit 27, Mich.

Built of seasoned hardwood, the platform measures 52 inches long by 27 inches wide. It is adapted for crowded aisles and narrow doorways. The truck is completely metal-bound for longer life. Steel end racks, with push handles, are 36 inches from the floor. There are four 6- by 2-in. caster wheels, two swivel and two rigid. The device may also be obtained with rubber or metal wheels. Weight is approximately 150 lbs.



ROBINSON
BIG SAVINGS POSSIBLE
Air-Activated
in Handling Bulk Cement
CONVEYOR



Is your cement storage bin 100 feet or more from the siding? Are there any obstructions between storage and siding regardless of distance to make mechanical handling impractical?

Look into the merits of the Robinson Air-Activated Conveyor. With it, you can get shipments in hopper bottom cars; unload each car in two hours or so; and operate season after season without heavy maintenance. Pipes do not clog because the cement does not encrust. There are no continuously moving parts, screw feeds, bearings, etc., that so frequently cause shut-downs and maintenance.

If you wish to save in costs for handling your bulk cement, investigate the Robinson System. Write to us.

ROBINSON Air-Activated **CONVEYOR SYSTEMS**
Division of MORSE BOULGER DESTRUCTOR CO.
Representatives in Principal Cities
211-G EAST 42nd STREET • NEW YORK 17, N. Y.

SAVE TIME
On Every Job
WITH A
CLIPPER
MASONRY SAW

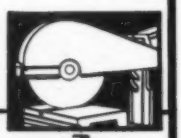
Cuts
- FIRE BRICK
- BUILDING TILE
- CONCRETE BLOCKS

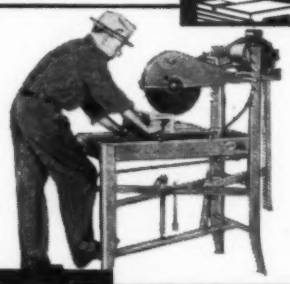
with
AMAZING *Speed* AND *Accuracy*

• You'll be amazed how quickly and easily you can cut virtually any special length or shape from the hardest masonry materials. Clippers save time — save material, assure better workmanship on every job.

Cuts DRY

Clipper's exclusive design is guaranteed to provide the highest economy with most rapid cutting speed. With or without foot pedal control.





Cuts WET

No dust. With foot pedal control or without. You can set the cutting head in locked position. The hardest materials cut with ease.

FAST *and* FLEXIBLE

The New Model HD-48 Clipper cuts dry just exactly the same as regular Clipper Masonry Saws.. and for Dustless masonry cutting just turn on the circulating system and slice thru the hardest materials. Proven by ten years use throughout the world. Guaranteed to provide the fastest cuts with lowest cost.

TAILOR MAKE SPECIAL SIZES

Yes . . . with a Clipper it's easy to slice thru Brick, Tile, Concrete, Glass, Marble, Porcelain or any kind of Refractories . . . Straight cuts, Angles or Mitres. CLIPPERS FOR EVERY JOB — Priced as low as $195. Write for Catalog Today!

THE CLIPPER MFG. CO.
2801 WARWICK • KANSAS CITY 8, MO.
PHILADELPHIA CLEVELAND ST. LOUIS AUSTIN, TEX.

Trade Notes

Gene Olsen, formerly president of the Stearns Manufacturing Company, Inc., Adrian, Mich., has disposed of his interest in that concern, which is now under new management. We quote from an announcement published by the company's new officials:

". . . The former management of Stearns have recently sold their holdings in the company . . . About the only change of importance in the organization is that Mr. Myron Hultmark succeeds Mr. Gene Olsen as president.

"Mr. Olsen has kindly agreed to remain here a few weeks to help carry through and acquaint Mr. Hultmark with the work of the company. He will also be available to us for some time in the future for consultation.

"Everything in our line that has been offered will continue to be produced and sold. Only the economic conditions, which affect any manufacturer, will reflect in any change, as would have been the situation with the former management."

Through a recent federal court decision handed down in Los Angeles, the manufacturing and sales rights on Salsbury Turret Trucks have been returned to the original owners, Salsbury Corporation, 1161 East Florence Avenue, Los Angeles, Calif. These rights were formerly in the possession of Salsbury Motors, Inc., of Pomona, Calif., until recently a subsidiary of Northrop Aircraft, Inc.

Bow Lake Equipment Company, Seattle, has been appointed distributor for Noble concrete batching equipment in western Washington and British Columbia.

Specializing in concrete and air equipment, Bow Lake is also distributor for Chain Belt Co. and Le Roi-Rix. Conrad Creim is president of the firm; Scott Simenstad, vice-president, and Mrs. Marjorie R. Creim, secretary-treasurer.

Robert Bergner, Bourbon, Ind., has purchased the concrete products plant formerly operated by Robert Kirkman at Rochester, Ind.

Enlargement of the L. D. Biggs Block Company's plant at Petersburg, Ind., is currently in progress. Officers are Marion Biggs, president, and Lawrence D. Biggs, secretary and treasurer.

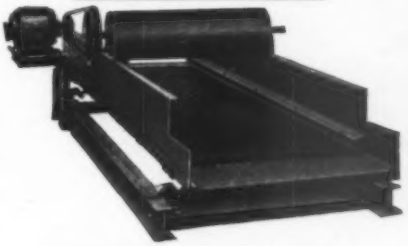
Wyoming Valley Cement Products Co. has placed in operation in Wilkes-Barre, Pa., a new plant making vibrated concrete blocks. D. Pasquini & Son own and operate the plant. The firm's offices remain at 518 Hazle St.

CINDER CRUSHERS
FOR BLOCK MAKERS

10 to 20 ton per hour capacity
$474

25 to 50 ton per hour capacity
$1074

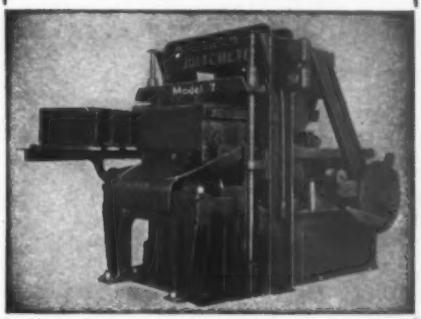
Prompt Delivery



VIBRATING SCREENS
For almost any type of screening operation, wet or dry. Makes your product more uniform and of higher quality.

BONDED SCALE CO.
129 Bellview Avenue
Columbus 7, Ohio
Manufacturers of Scales, Crushers, Conveyors and Vibrating Screens

The Vibration Machine Supreme

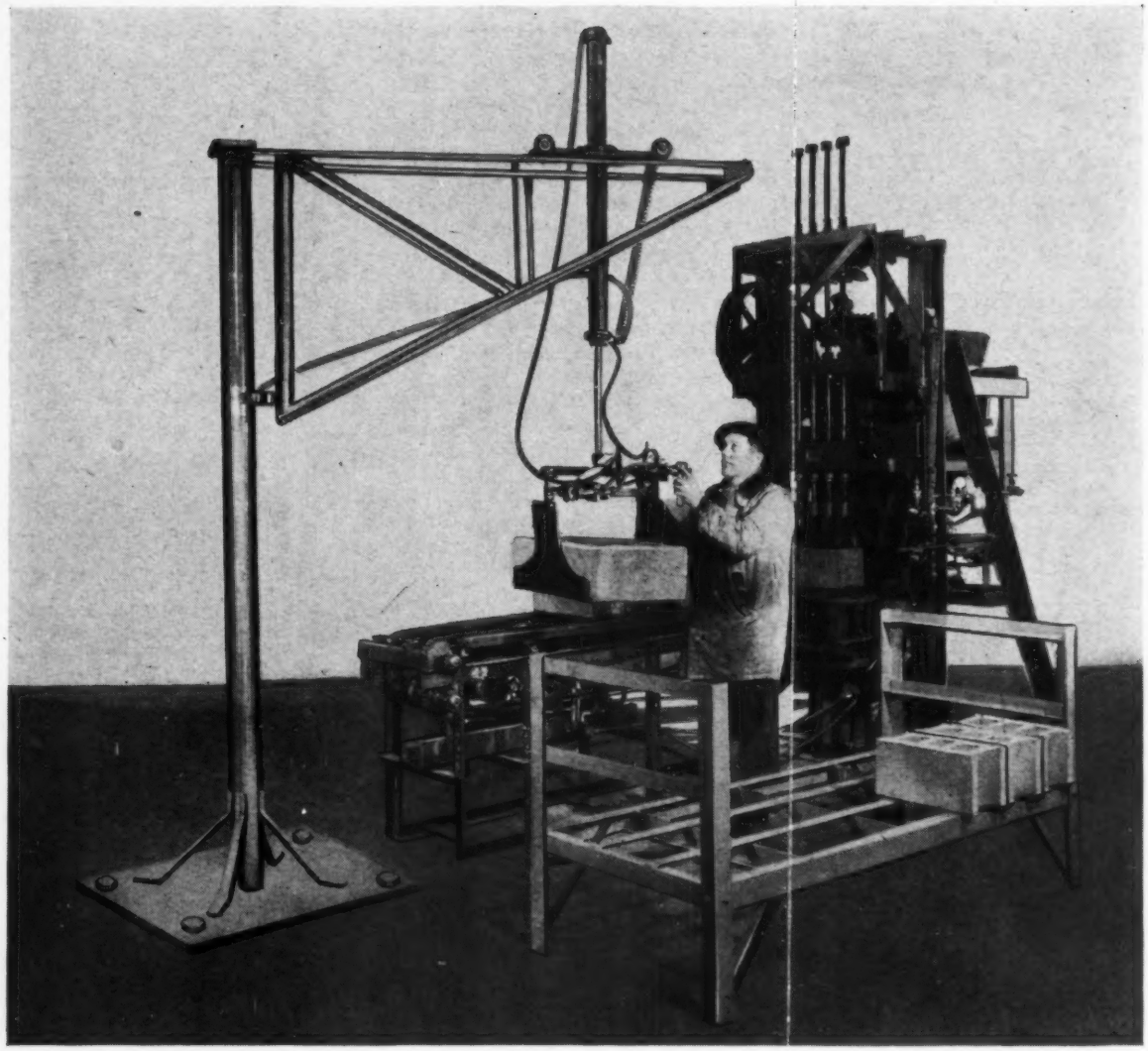


Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

Stearns Clipper Stripper Machines; Stearns Joltcrete Machines; Stearns Mixers; Cast iron and Press Steel pallets. Straublox oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Frisl, Manager Columbus, Ohio

KELLEY • EQUIPMENT
is setting the pace



The New **KELLEY BLOCK SNATCHER**
is easily attached to the Kelley Power Stripper or any similar machine for continuous automatic removal of stripped blocks onto a conveyor. Air operated.

We also manufacture . . .
20 and 30 cu. ft. capacity mixers, direct motor drive or with clutch pulley drive; conveyors, Skip-Loaders, Bucket Elevators, Bins, Pallets and Racks.

We can also supply . . .
Lift Trucks, hand or powered; Crushers, Screens, and Feeders.

THE KELLEY BLOCK STACKER
is air-operated, and removes three 8″ blocks at a time from conveyor, with other sizes in proportion.

In developing these units, much effort was given to simplicity of construction, thereby eliminating continuous adjustments while in use.

WE HAVE SERVED THE INDUSTRY FOR OVER THIRTY YEARS

Write for further information about this equipment.

E. B. KELLEY CO.
FARMINGDALE NEW JERSEY

First Step toward Bigger Profits

Read how breaking two walnuts can start you on the road to increased profits.

Tie one of them on a string and whirl it sharply against a hard surface. See how easily it breaks ... how uniform the pieces are. That's because the breaking force was evenly distributed. This walnut was broken by *impact*.

Now crush the other with a pair of pliers. Much greater effort is needed. The force is concentrated on one small area which is pulverized too fine for use. The ends of the nut remain in comparatively large, irregular pieces. More power succeeds only in producing an undesirable product.

New Holland Double Impeller Breakers use *impact* breaking in its most efficient form. They can reduce stone to a uniform, cubical product as small as minus 1", in *one fast, economical operation.*

Get full information about the breakers that produce a more saleable product *with less power per ton.* Write today for New Holland's illustrated catalog on Double Impeller Breakers. In the meantime, ask your dealer for a showing of "The New Stone Age", a sound and color movie. See and hear the complete story of Breakers that produce more for bigger profits.

NEW HOLLAND MANUFACTURING COMPANY

DIVISION
NEW HOLLAND MACHINE COMPANY
DEPT. R-8, MOUNTVILLE, PA.

PROTECT YOUR DRILLS AGAINST RUST AND WEAR

Texaco Rock Drill Lubricants EP help you drill more footage at lower cost

TEXACO *Rock Drill Lubricants EP* are "extreme pressure" lubricants, made to protect moving parts under the most severe conditions . . . and to prevent the formation of rust whether your drills are running or idle.

For added protection, *Texaco Rock Drill Lubricants EP* are made to stay fluid at low temperatures . . . to resist washoff . . . to keep parts free of gum and carbon formations. Drill doctors everywhere say they're the best assurance of trouble-free operation, longer drill life, lower maintenance costs.

Texaco Rock Drill Lubricants EP meet the specifications of leading rock drill manufacturers. Use the viscosities recommended for your particular drills and operating conditions.

To assure efficient compressor operation . . . to keep valves clean, rings free and air lines clear . . . use the recommended *Texaco Cetus, Alcaid or Algol Oil.*

A Texaco Lubrication Engineer will gladly advise you. Just call the nearest of the more than 2500 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

NEW! "Lubric tion of Air Drills and Compressors" — a profusely ustrated, 32-page book describing in great detail the lubrication requirements of air compressors and air drills. Send for your free copy today.

TEXACO

TEXACO Lubricants and Fuels

Tune in...Texaco Star Theatre every Wednesday night featuring Gordon MacRae and Evelyn Knight...ABC Network